GAS

MAY 1959

The Pipeline to Sunshine

A CHILTON PUBLICATION

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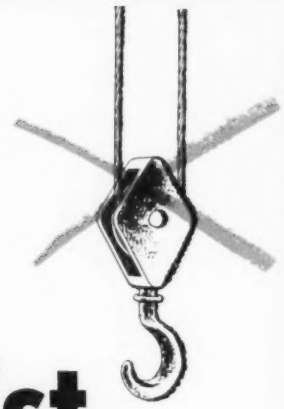

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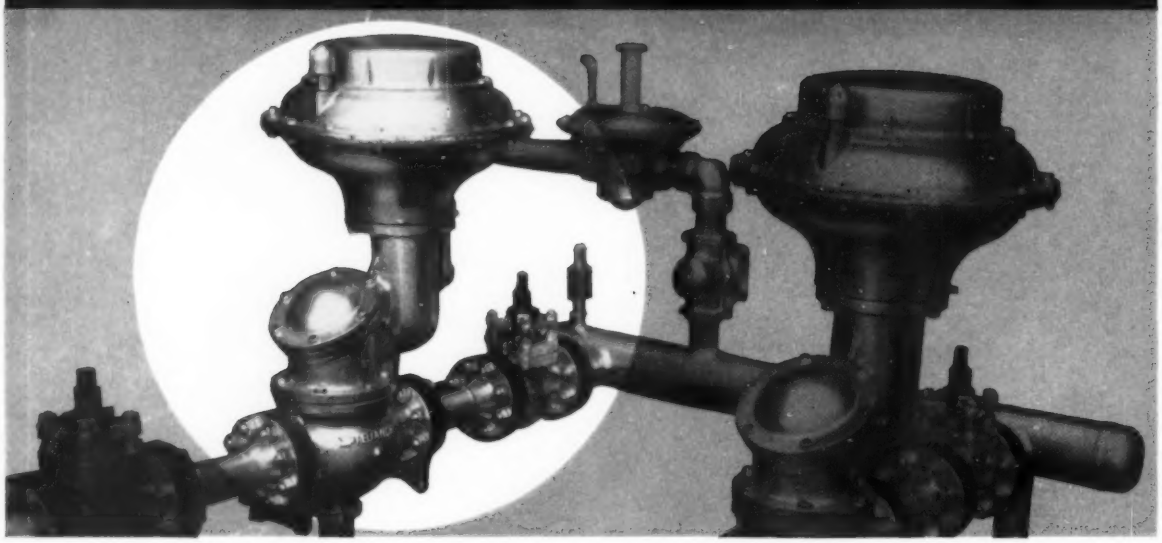

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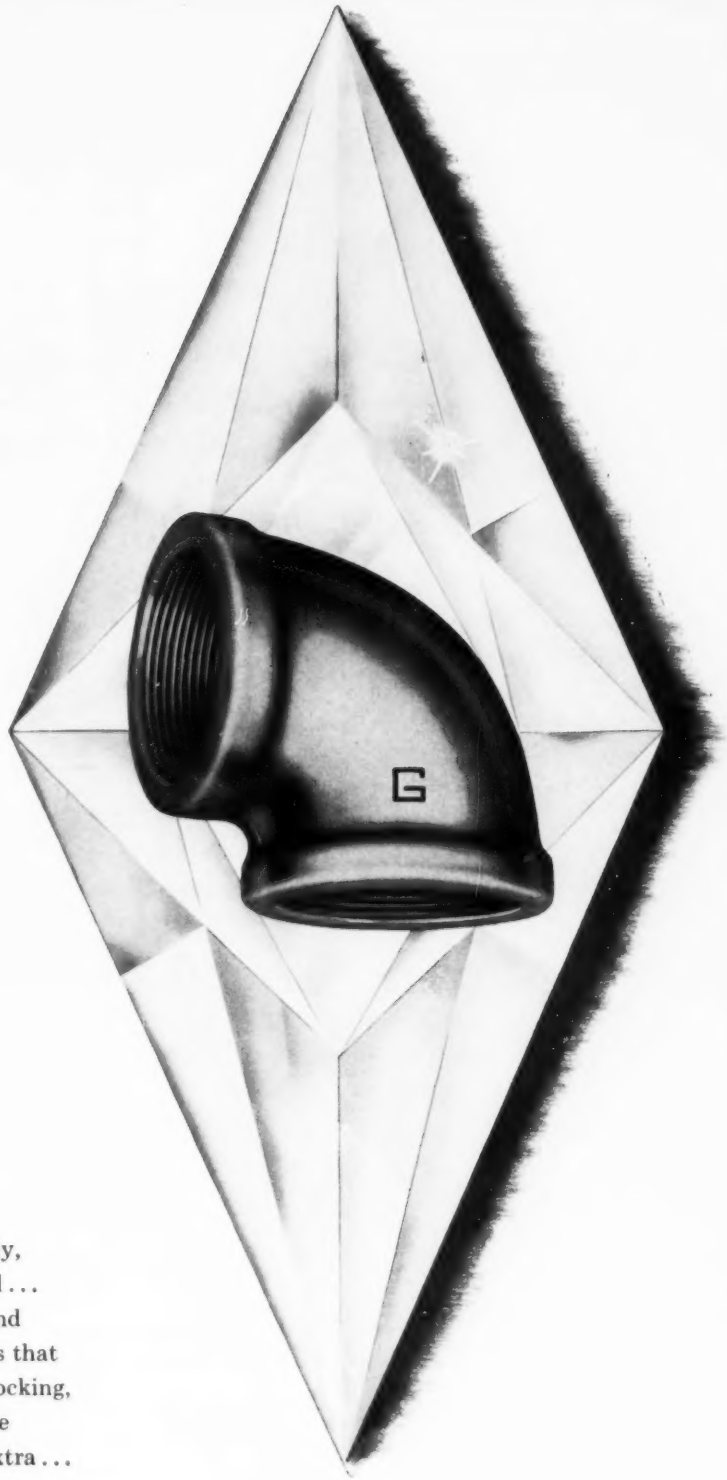

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BPA

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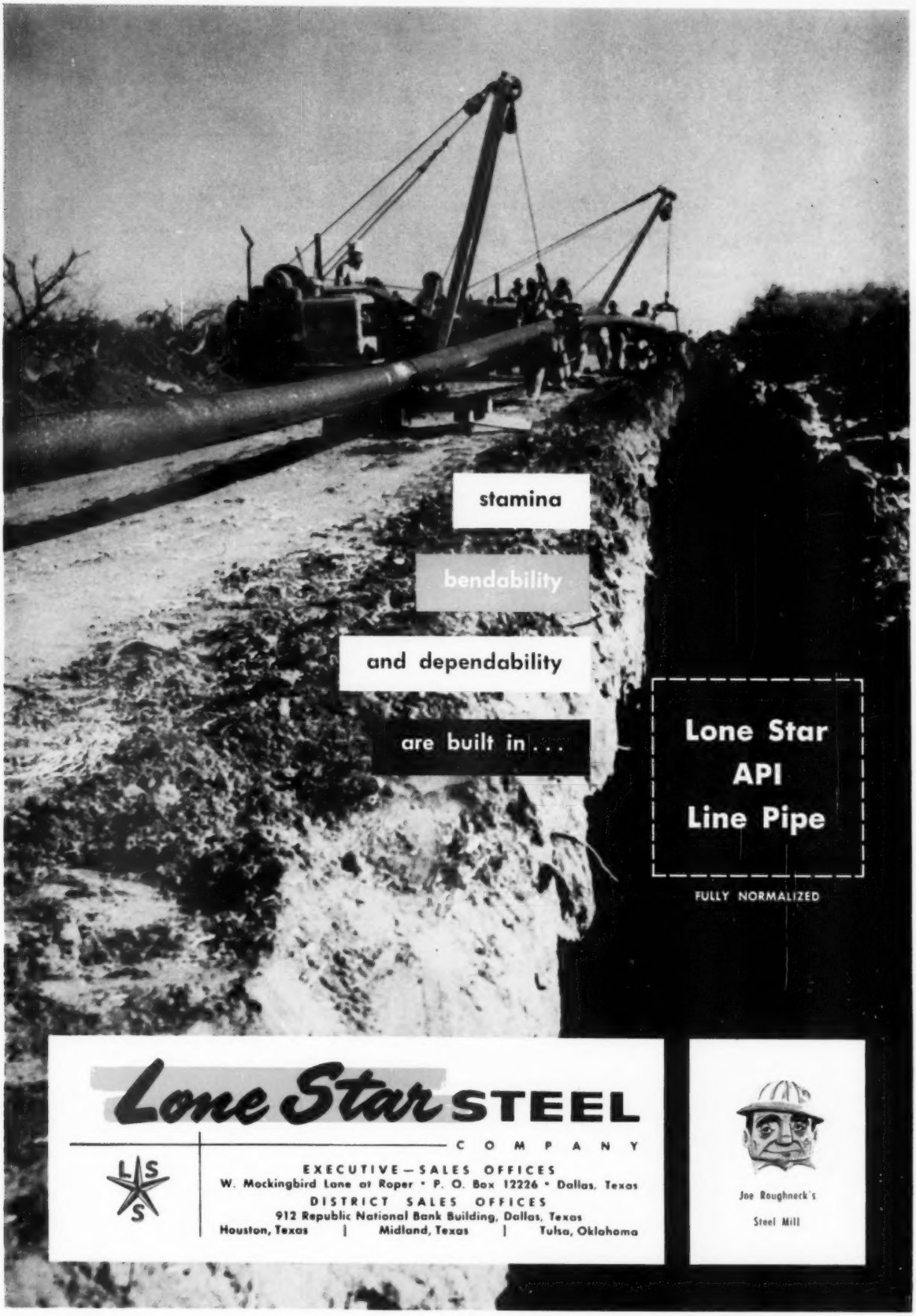
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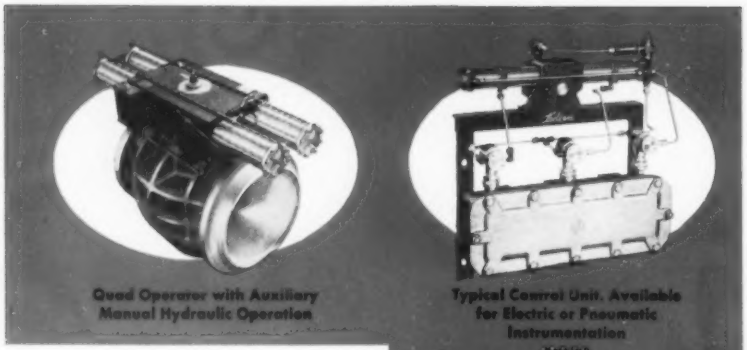

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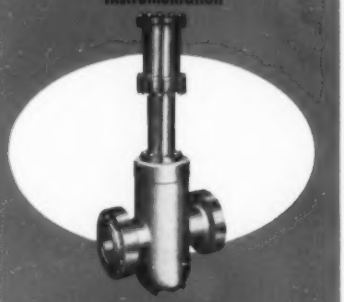
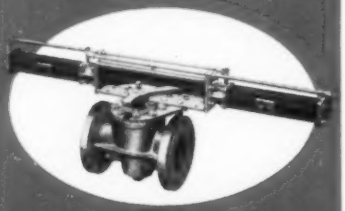


High Pressure Gate Valve Operator



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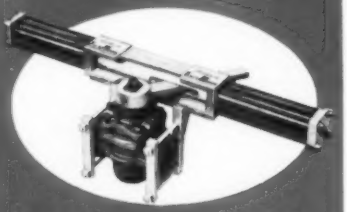

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MR. CONTROLS

GAS

MAY 1959

Thermally Thinking

DO you know how the millions of gas-burning appliances currently in operation are doing? Are customers of your company satisfied with the performance of their gas appliances? Well, I don't know either. But there is a way we can find out. That's through the "National Appliance Field Observation Program."

This deal is different from a lot of committee-type spectaculars that whirl up a big wind for a few weeks and then slip into oblivion. This program is a product of the AGA customer service committee and it has already demonstrated during a limited trial period that it can produce results. Every gas utility and employee thereof can't help but be interested in NAFOP because it is aimed at cutting down operating costs that amounted to $69.3 million for customer service in 1956. If the industry can slice into a piece of money like that, then it's really getting somewhere.

In a most simple form, the National Appliance Field Observation Program is a plan under which gas utilities all over the nation will report common and serious causes of service calls to a central source for analysis and action. Basic data will be from actual service experience. Results produced will reduce the number of service calls that have to be made and increase customer satisfaction with gas appliances.

Needed: Full support from operating gas companies that offer some form of appliance service to their customers. The returns will more than offset the really little effort involved.

It was mentioned earlier that NAFOP has worked. This is true. A trial period got results and proved that a nationwide, full-scale program is both feasible and needed. For example, in the 18 months prior to Jan. 1, 1959, 21 operating gas utilities submitted 347 reports on their service experiences relative to appliances in customers' homes. Some 190 of these were brought to the attention of the several departments of AGA Laboratories: 10 were referred to the lads who work up the approval standards; 79 reports went to the testing department for comparison with results of approval tests and study of existing interpretations of requirements; and the inspection department was handed 105 reports for discussion with manufacturers in regard to product quality and manufacturing practices.

Then, certain matters were brought up with appliance manufacturers. They responded in connection with 64 of the field observations. For example, manufacturers changed production methods in 16 cases, modified designs in 15, corrected inspection procedures in 19, and revised installation instructions in one.

Now this is what I call getting some results. When something keeps turning up time and time again on appliance service calls all over the nation, it just makes sense that a central program can pick up these trouble spots and take the dope to where it will do the most good.

With a limited program turning out such results, it follows that a full-scale national appliance field observation program is a natural. With nearly all gas utilities on natural gas for the base load, there are many common utilization problems. Every utility from border to border and coast to coast can cut its appliance service calls operating expense with this program.

Any utility that takes even a stab at servicing gas appliances for customers can make a contribution to NAFOP. And it isn't a whole lot of trouble or work, either. You don't have to change service department routines very much and you don't have to spend many man-hours with your participation.

The objective is the encouragement of appliance improvements in keeping with actual field experience. The net result to a gas utility will be: (1) reduction of an operating cost, and (2) an increase in customer satisfaction. These benefits are obtained by identifying and eliminating common or serious causes of service calls, through collection and study of field observation based on actual service experience.

Talk it up in your company. If your company is dragging its anchor on this thing and didn't respond to it in February, find out why. Give your cooperation to this program. It'll help you.

J. Fred Ebsen
EDITOR

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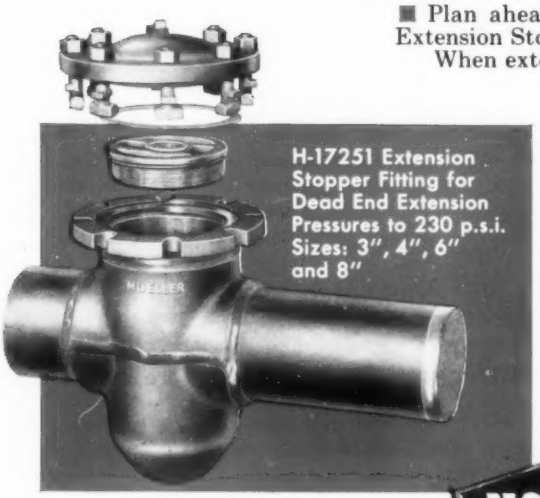

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GAS HIGHLIGHTS

Phillips ruling may affect 3000 producers

An FPC examiner proposed a new rate-making formula, based on cost-of-service, for independent producers which could cut deeply into anticipated revenues of some 3000 gas producers. Examiner Joseph Zwerdling ruled that Phillips Petroleum Co. should be allowed to raise its rates $14 million annually, instead of the $49 million yearly hike it sought. Mr. Zwerdling's formula is now subject to commission review. (See page 141.)

Examiner okays NNG expansion

Northern Illinois Gas Co. may soon be getting 50 MMcf per day of gas from Northern Natural Gas Co. A presiding examiner has approved Northern Natural's bid to begin serving Northern Illinois, and increase supplies to 23 existing customers in five states. Project will increase NNG's overall system capacity by 100 MMcf per day, at a cost of $15.9 million.

Alberta gas board approves exports

Alberta's Oil & Gas Conservation Board has okayed two plans to export gas to the U. S.—but it whacked down the quantities drastically. Alberta & Southern Gas Co., a Pacific Gas & Electric Co. subsidiary, asked to export 460 MMcf daily for 25 years—the board gave it 360 MMcf daily for 17 years. Westcoast Transmission Co. Ltd. sought an additional 1.4 trillion cu ft over 25 years—it got 0.8 trillion in 17 years. Both the Alberta provincial and Canadian federal governments must now approve. Neither is bound by the conservation board's action.

Examiner scuttles Trunkline plan

An FPC examiner may have torpedoed Trunkline Gas Co.'s $81.5 million expansion project, which would provide gas for Consumers Power Co., Jackson, Mich. The presiding examiner violently objected to Trunkline's proposed tariff ($3.57 demand, 34 cent commodity, and 95 per cent take or pay).

New idea for water pump engine energy

Arizona Public Service Co. has proposed a service which actually will be selling energy delivered to the pump shaft on irrigation water pumps. The utility will furnish a gas engine, gearhead and other accessories needed to drive the water pump, selling actually the delivered energy. Gas company also will maintain, service and operate the equipment. The plan now awaits an approval from Arizona Corporate Commission.

El Paso to start search for coal

El Paso Natural Gas Co. has entered into an agreement with the Navajo Tribe to explore for coal on the Navajo reservation near Farmington, N. M. If sufficient coal deposits are found, El Paso plans to build a pilot plant to produce synthesis gas through hydrogenation of coal.

Appliance sales top forecast

Gas appliance and equipment sales are well ahead of earlier forecasts, GAMA reports. GAMA new feels combined shipments of household, commercial and industrial gas equipment will top the 1958 total by nearly 15 per cent, instead of the 9 per cent predicted last December.

$35 million invested to improve appliances

Manufacturers of household gas appliances and equipment invested well over $35 million in product design, development and testing facilities in 1958, and are spending at least that much this year. That's what Edward A. Norman, new GAMA president, reported at that group's recent meeting. He also pointed out that the day is past when the top of the maker's line is reserved for the "elite" market only. Today's high average income rate and equally high living standard has made us an elite nation, Mr. Norman said.

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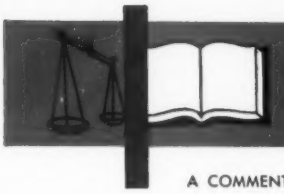

Regulatory and Legislative Trends

A COMMENTARY ON NATIONAL AND STATE DEVELOPMENTS BY AN EXPERT IN UTILITY LAW

Plastics piping progress

THE Florida Public Utilities Commission held a novel hearing recently on safety standards and plastics pipe for the distribution of natural gas. There is more to plastics than hula hoops. The commission stated that from the evidence it appears that plastics pipe has been used for several years to some extent in a number of other states for distribution and services of natural gas. It does not appear, however, that any federal or state commission or any recognized authority on standards has yet affirmatively approved such use of plastics pipe. Apparently such use in other states has been without any formal approval by the commissions having jurisdiction in those states.

This commission concluded that it should not adopt a rule on the subject and it should neither approve nor disapprove the use of plastics pipe. The commission asserted that all gas public utilities operating under its jurisdiction should be authorized in the exercise of their own good judgment and discretion, as a prerogative of management, to use plastics pipe for distribution and services of natural gas to their customers subject to the following requirements:

"1. The utility shall strictly adhere to the recommendations contained in the report of the Subcommittee of the American Gas Association on Plastic Pipe Standards designated DMC-56-16 and any subsequent report of said committee.

"2. The utility shall strictly adhere to reasonable safety standards and practice in installation and use of such pipe."

• The history of plastics pipe

The gas industry is using more plastics pipe each year for services and small distribution main extensions. Practically all of the $60 million of annual plastics pipe production is from thermoplastic materials. Thermoplastic is a material which can be formed by the application of heat and pressure. No chemical change takes place in the forming operation. In 1942 Southern California Gas Co. used plastics pipe when steel and copper were scarce. This was followed in 1947 by the extrusion of polyethylene pipe for ground water in mines. Polyethylene has high chemical resistance to corrosion. Semi-rigid pipe is made today from cellulose acetate butyrate and similar materials. It is easily joined by the simple use of slip-on joints and a solvent welding operation. Light weight and corrosion resistance are attributes of plastics pipe.

• The American Gas Association standards

The new era in pipe making was noticed by the alert American Gas Association, which started a scientific study in 1952 to develop standards for plastic pipe. The committee was composed of AGA members and representatives from the plastic industry. The AGA report, which the Florida commission required natural gas companies to comply with, contains protective standards. One caution is contained in the AGA report. Plastics pipe is not presently recommended for handling manufactured gas, says the committee.

Plastics pipe is immune to electrolytic corrosion which attacks steel pipe. Plastics pipe resists more acids, alkalies and salts than any other pipe material. The shortcoming of plastics pipe is the relatively low strength. It can be cut easily which makes it less serviceable than steel pipe in populated areas with recurring excavations.

The AGA report on plastics pipe standards is enlightening and encouraging, so let us examine the significant parts that impressed the Florida Public Utilities Commission.

The general purpose of the committee activity is to develop technical standards that the gas industry could adopt for the purchase and use of plastic materials for underground gas piping. The committee will continue to release advance information on the subject to the gas industry in the form of recommendations which may be used as a guide for the general and prudent use of plastics pipe materials until technical standards can be developed and adopted.

It is by gas company enterprises in the past that we have been able to accumulate a large amount of knowledge of the qualifications and serviceability of currently available plastics pipe materials.

All recommendations are subject to revision when such action is warranted by new authoritative information from future developments in research, experimentation and experience.

The AGA committee recommends:

"1. It is recommended that specific rather than generic material terminology be used in oral or written discussions of plastic materials.

"The word *plastic* is a generic term which applies to a distinct group of materials such as the word *metal* which also applies to a distinct group of materials. Each of the numerous plastic materials has its own peculiar physical and chemical properties which must be considered before

its applicability and serviceability for any end use can be determined.

"2. It is recommended that the consumer thoroughly investigate the qualifications of any and all kinds of plastics pipe that are under consideration for any application before the material is used.
"At the time that this recommendation was resolved, and although at that time a few of the currently available materials had been used with success to date, the subcommittee was not prepared to make any recommendations with respect to what materials were acceptable for use in the gas industry. Since that time, a few specific plastic materials have been recommended for a specific end use. These materials are identified under recommendation No. 6.

"3. Thermoplastic pipe produced from currently available materials for gas industry use underground is not recommended for the distribution of gas which contains aromatic hydrocarbons.
"It is generally believed that currently available thermoplastic pipe materials are subject to attack by aromatic hydrocarbons. Therefore, the subcommittee cannot recommend the use of such pipe for the distribution of gas which contains aromatic hydrocarbons until further research and tests have been completed.

"4. Barlow's or Lamé's formula is recommended for use in the calculation of the burst values of plastic materials. The use of the formula which provides the lowest value for the bursting strength of the material is specifically recommended.* * *

"5. Two standard plastic materials pipe size schedules, . . . were tentatively recommended to the plastics industry as plastics pipe sizes which should be offered by the plastic materials pipe manufacturers for use in the gas industry.
"It is the consensus of the subcommittee members that two plastics pipe size schedules will be adequate to meet the needs of the gas industry. The plastics pipe manufacturers have expressed their willingness to produce pipe to any size standards recommended by the subcommittee. They have informed us that under no conditions should these pipe sizes be threaded. * * *

"6. The thermoplastic materials, polyvinyl chloride, styrene-acrylonitrile and butyrate, . . . are the only thermoplastic materials currently recommended for natural gas distribution pipe. * * *

"7. The working stress values (tensile constants), . . . for specific plastic materials, are recommended for use in Barlow's or Lamé's formula to calculate burst values of these materials at operating temperatures not in excess of 100 F. * * *

"8. The wall thicknesses . . . for the various kinds and sizes of thermoplastic pipe are recommended as minimum thicknesses for such pipe to be used as underground natural gas distribution piping and subjected to pressures and temperatures not in excess of 60 psi and 100 F, respectively.
"The pipe wall thicknesses recommended are based on hoop stress values less an appreciable safety factor. They are minimum, not only to withstand the pressure and temperature service ranges noted, but to withstand normal earth and traffic loads, and normal transport, handling and installation stresses. Caution should be observed, of course, in the use of mechanical and hand earth compaction equipment during trench backfill operations.
"Plastics pipe in all sizes of all of the various materials listed below in the pipe size schedules should be connected by the solvent and/or cement weld process. None of the pipe sizes should be threaded because of insufficient wall thickness after threading and because of the possibility of thread deformation. It is recommended that any kind of plastics pipe which can be solvent and/or cement welded should be so assembled.
"Butyrate pipe in the copper pipe sizes and in at least the ½-in. and ¾-in. iron pipe sizes may be coiled for shipment, if desired. All other materials specifically mentioned hereunder in all pipe sizes should be furnished in straight lengths only, but may be sprung within reasonable limits to facilitate installation. * * *

"The subcommittee believes that conventional material test methods, in general, are not applicable to plastics pipe, and that there is a definite need for the development of new test methods and procedures which would be acceptable for the determination of plastic material strength values such as tensile, impact, etc.
The subcommittee tentatively accepted the plastics pipe impact strength test method submitted by the Southern California Gas Co. with the reservation that later developments may be incorporated. It is recommended that immediate consideration be given to the testing of plastics pipe by the accepted method with the test specimens subjected to a range of operating pressures and temperatures. The Society of the Plastics Industry was requested to extend the details of the test accordingly and conduct appropriate tests on each kind of plastics pipe.

"The subcommittee has discussed the question of thermoplastic pipe susceptibility to deterioration by drip oils, alcohol, other anti-freeze solutions, etc. The subcommittee believes that sufficient evidence is not now available to indicate just which plastics are affected by which chemicals and to what extent plastics sensitive to such chemicals will be affected by degree of chemical concentration and by injection of the chemical in the liquid or the vapor state. It was agreed, however that not all plastics are subject to deterioration by the various chemicals which may be injected or which may develop in a gas distribution main or service. The Society of the Plastics Industry has agreed to give further study to the matter.

"The subcommittee has recently recommended to the Society of the Plastics Industry that they give immediate consideration to the development of a uniform

Continued on page 166

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TECHNICAL TRENDS

By GUY CORFIELD

What is the prospect for civilian nuclear power?

The status of accelerated development of this country's civilian nuclear power program appears to be somewhat uncertain. There is considerable feeling that acceleration is urgently needed, but there is also the indecision arising from the continual controversy over public versus private ownership plus the present Administration's move for economy in national expenditures.

The Atomic Energy Commission's Special Advisory Committee on Reactor Policies and Programs, and Congress' Joint Committee on Atomic Energy, are both urging vigorous development. AEC's Special Advisory Committee has listed the following recommended objectives for the U. S. civilian nuclear power program.

Fortify the position of leadership of the U. S. in the technology of nuclear power for civilian use.

Reduce the cost of nuclear power in this country to a point competitive with power from fossil fuel at least in some areas within 10 years.

Reduce the cost of nuclear power to the competitive point in friendly foreign nations having high costs of energy in less than 10 years through a comprehensive program of assistance clearly defined and vigorously pursued.

Achieve a substantial reduction in the cost of nuclear power over the next 20 to 30 years by continuing studies which may ultimately lead to great cost reductions, but which are unlikely to bear fruit in the next 10 years.

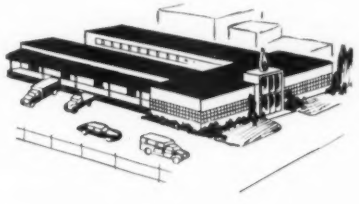
Make the fullest use possible of the nuclear energy latent in both uranium and thorium, especially by breeding, recognizing that U^{235} alone is probably not sufficiently plentiful to contribute significantly to our power needs over the long range.

It appears from the above that the difficulties in relatively early development of economic nuclear power are, for the most part, other than technical.

Infra red detects offshore gas seepage

There have been numerous recent articles on the use of the infra red gas analyzer, calibrated for methane, to check for leakage of natural gas. It is so sensitive and so specific for methane (the principal constituent of natural gas) that an air sample taken at the ground surface while driving along a pipeline right-of-way, or even along a street, and passed through the analyzer, will reveal the presence of natural gas. It is then necessary only to back track and pin point the location of the leak.

This same technique has been applied to offshore prospecting for petroleum in the waters of the Gulf coast. The analyzer is carried on a boat which traverses the water area in a planned course, recorded and fixed by radar with respect to time and location. A continuous sample of water is taken, and dissolved or entrained air or gases are separated and passed through the analyzer. If methane is detected it is recorded on a timed chart. Thus, after the initial exploratory cruise, the boat can return to the points where methane was indicated, and check more carefully.



Allowances have to be made, of course, for tides and currents, discharge from rivers that might be carrying gas, etc. Also there is the assumption that underlying oil is accompanied by gas, which is usually but not necessarily true. In general, the method is proving to be an economical means of rapid and large area prospecting, comparable in cost to airborne land surveys.

G-E consolidates its lamp research

The recent announcement of General Electric's accelerated lamp research program is of competitive interest to the gas industry in both the heating and the revived lighting fields. Lamp research activity has been consolidated in a multi-million dollar center in NELA Park, Cleveland, Ohio, with 12,000 sq ft of floor space and a staff of 250 people.

The center will have three main spheres of activity: lamp research, lamp engineering research, and radiant energy effects. In lamp research, study will be made of the chemical and physical processes which produce light; how lamps can be made cheaper, brighter and with longer life; and how better lamps can be developed for *cooking food, drying paint*, etc. Lamp engineering research will translate developments into production techniques. Radiant energy effects research will investigate the properties of light and its relation to and improvement of human vision and growth of animals and plants.

New Barber-Greene 7′ Wheel Ditcher crowds through rugged caliche in Texas—at speeds many times greater than ladder ditchers or back hoes working in the area. Write for details.

NEW 7-FOOT WHEEL DITCHER

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WASHINGTON

By NEIL REGEIMBAL
GAS Washington Bureau

Gas bills pouring into hopper

DEATH of the Harris natural gas bill for this year, if not forever, has brought out what might be called (in jest at least) the legislative vultures.

Now that it's crystal clear that the Harris bill stands about as much chance of passing as the colloquial snowball in a hot spot, the various segments of the gas industry which were so tenuously knit in compromise are again looking to protect their own interests.

As a compromise, the gas bill never really succeeded. Rep. Harris, a plain-spoken conservative Arkansas Democrat, admitted as much privately many times before his speech in early March before a bar association meeting. The independent producers weren't happy with it. The pipelines as a group weren't either. Although they never publicly opposed it, the coal-sponsored amendment prohibiting so-called "dump sales" probably would have driven most of them from the fold.

Harris put the cork in the bottle before the assembled lawyers. He confirmed that he has no plans for holding hearings on his or any other gas bill this year "unless conditions change."

These conditions he listed as the complete refusal of the Eisenhower Administration and the President personally to even endorse the principle of freeing natural gas producers from utility type controls—as he has done in the past—much less to actively line up some GOP support.

Harris has consistently demanded that Republicans match Democrats support for the measure so it will carry a bipartisan label and escape as much as possible from any future political stamp if it is ever passed.

He also noted that even if conditions should change, and the reluctant industry segments and Republicans line up, it "will be too late" to pass the measure.

This was when the "vultures" swooped. On the outside chance that gas bill opponents might slip through one of their bills, or that the Harris bill might somehow silently become law, they have tossed into the hopper all manner of measures.

For the most part, these are bills which would flatly grant what a segment of the industry has long wanted. One, for instance, was introduced by Reps. Bruce Alger (R.-Texas) and John Bell Williams (D. Miss.). This short (only 16 lines long) measure would simply reverse the 1951 Phillips decision of the U. S. Supreme Court and restore complete freedom from federal controls for independent producers. It would do this by flatly stating that the natural gas act does not apply to independent producers not engaged in interstate gas transmission.

Pipeline interests also are ready to plug the gaps. Several are attempting to develop natural gas legislation for introduction in some future year which would remove utility price control from independent producers.

The approach is that producers would bid against each other to sell gas to pipelines. This, its backers say, would set a competitive price for gas in the field, insure a reasonable price to producers, and protect the consumer's interest. Under this proposal, the FPC's function would be principally to insure free, open, and competitive bidding.

The action of Rep. Harris in officially burying the gas bill was unnecessary. It had been an accepted fact in gas circles and around the nation's capital since early in the year.

FPC officials similarly had obviously reached the same conclusion. Commission members, in an increasing (for them) number of public speeches and appearances have for some time been discussing methods of living with, streamlining, and generally getting cast the controls they must exercise over independent producers under the high court's order.

The commission is doggedly trying to make some headway in determining what constitutes cost of production, in which cases it must be the determining factor, and the extent of the government's obligation in initial contract prices.

All of these questions are being bandied about in the courts, with some sharply divergent decisions already on the books. It appears likely that the Supreme Court, which imposed the problems in the first place by requiring federal control, will in the end have to decide these issues.

In one recent case, the right of industries indirectly affected to intervene in FPC proceedings was upheld. The U. S. Court of Appeals set aside an FPC order authorizing natural gas to be sold for distribution in Virginia and upheld the right of a group of petroleum jobbers to take part in the arguments over the request for approval of the gas supply. The FPC had

Continued on page 168

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By MARSHALL E. PARKER

Prediction of leak rates-5

THE three derived functions now make it possible to write an equation predicting the cumulative leak rate for a bare line of any diameter and thickness lying in soil of any resistivity. The resulting equations should be used with a great deal of caution, and should in no case be considered as anything more than a rough first approximation. It is known with reasonable certainty that other factors than resistivity affect the leak rate, some of them rather strongly. It is furthermore known that a line lying in soil of widely varying resistivity is in general subjected to more vigorous attack than one lying in uniform soil, but no recognition has been made of this phenomenon. It is worth noting, however, that if a line lies in several discrete sections of different resistivity, the total cumulative leak rate of the several sections will be the same as the single leak rate of the whole, if for the latter calculation the *logarithmic mean resistivity* is used. This may be considered as another indication that the logarithmic mean is the one to use in averaging resistivities.

The equations are valid, as has been indicated, only for bare lines. It would be difficult to say, at this time, how to go about modifying them for coated lines.

A single example will be given of the calculations. Predictive leak curves will be derived for 2-in. schedule 40 bare pipe (e. g., flow lines) lying in three different soils —400 ohm-cm, 1000 ohm-cm, and 2500 ohm-cm. The calculations are shown in *Table 3*, and the resulting curves are drawn in *Fig. 9*.

Actually, the curves as presented are not realistic; they have been extended too far. A leak rate of 100,000 per mile is meaningless; long before any such rate could be approached, the line would either be abandoned, or the excavation and repair work done would have seriously modified the exposure, and hence the rate. However, the curve does tell us that bare pipe does not have a very long useful life in 400 ohm-cm soil.

When the line in question lies far enough north that it is in frozen soil for a part of each year, then the time scale should be modified accordingly. This can be done by a simple horizontal shift of the graph with respect to the scales. For example, if the frost period approximates 6 months, then the curve should be shifted to the right by an amount equal to the logarithm of 2, so that the frequency predicted by the equation for 10 years will be shown for 20. Four months of frost calls for a shift in the same direction equal to log 1.5, or 12/8; this will make 8 years leak require 12. In any such case the slope of the curve will remain the same.

- **Summary**

$N = K\,D\,W^{-1/a}\,T^{n/a}$, where

N = number of leaks (cumulative) per mile

D = outside diameter of pipe (actual) in inches

W = wall thickness of pipe, in inches

T = time, in units of ten years (see modification for frost)

Also, the three derived functions of ρ:

$\text{Log } K = 3.49 - 2.54 \text{ Log } \rho$

$1/a = 5.64 + 0.84 \text{ Log } \rho$

$n/a = 5.73 - 0.82 \text{ Log } \rho$

TABLE 3. Calculation of leak rate equations for bare 2 in. schedule 40 pipe, in three different soils.

ρ	400	1000	2500
log ρ	2.60	3.00	3.40
n/a	3.60	3.27	2.94
W	0.154	0.154	0.154
log W	9.19–10	9.19–10	0.19–10
	−0.81	−0.81	−0.81
1/a	6.89	7.08	7.27
10g $W^{1/a}$	−5.60	−5.74	−5.89
D	2.375	2.375	2.375
log D	0.38	0.38	0.38
log K	−3.11	−4.13	−5.15
log KD	−2.73	−3.75	−4.77
10g $W^{-1/a}$	5.60	5.74	5.89
log $KDW^{-1/a}$	2.87	1.99	1.12
$KDW^{-1/a}$	740	98	13
N =	740 $T^{3.6}$	98 $T^{3.3}$	13 $T^{2.}$

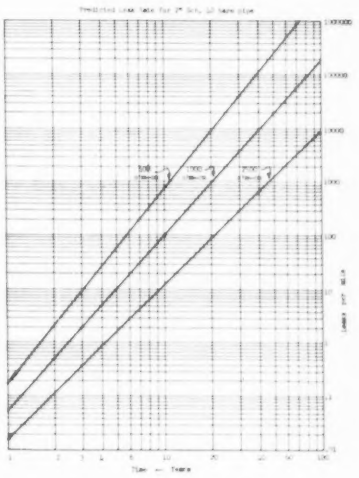

FIG. 9

COMPARE

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Mid West

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Chauncey Robinson
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Maurice Calaway
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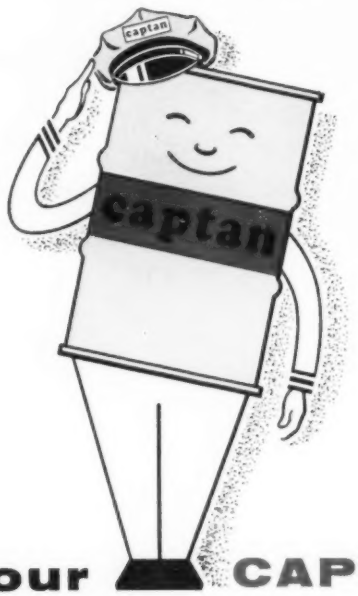

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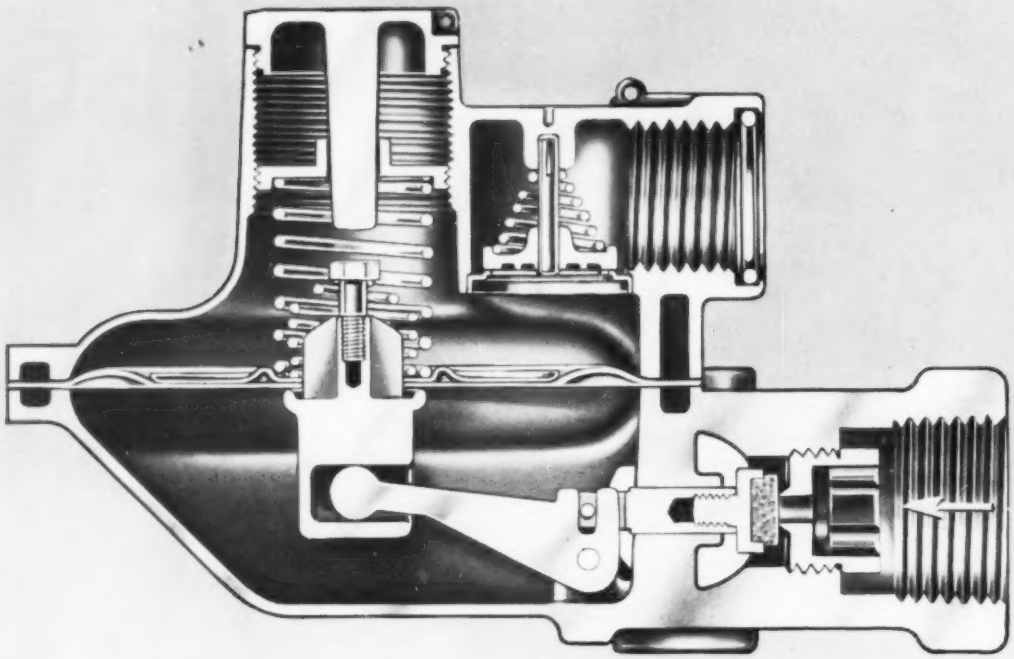
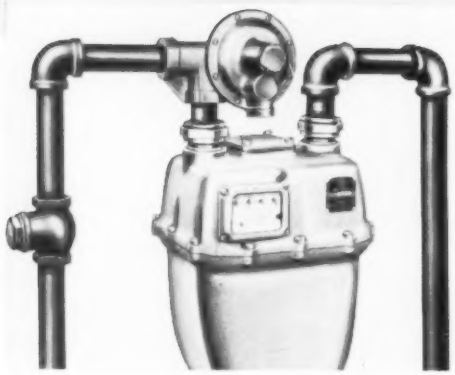
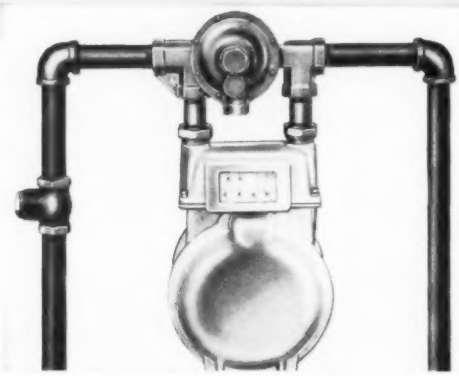


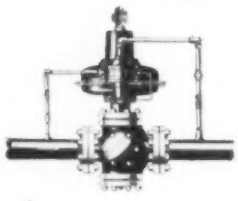


The new Fisher S250 service regulator makes a compact and neat installation. Installation problems are simplified and costs are lowered.



The S250 regulator with integral meter bar will be available soon. This new low cost regulator is a natural for the ultimate in piping hook up.

Write for Bulletin P-S250



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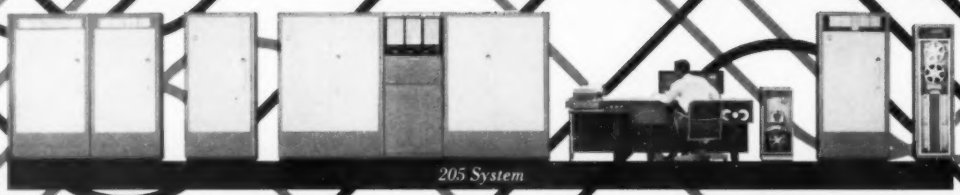
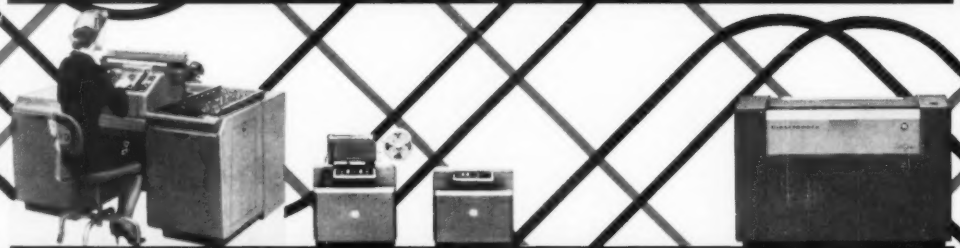


205 System



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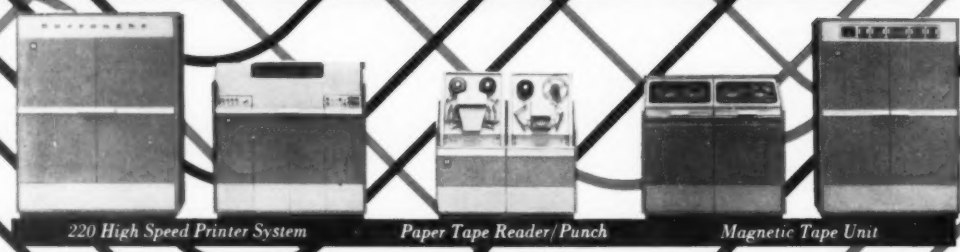

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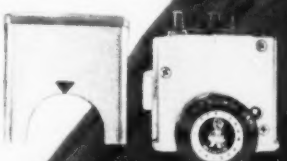

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When running service lines under roads and streets, auger drill deflection caused by fluctuations in air pressure can be a costly problem. On the work here pictured (tunneling 3" holes under 25' pavement, in sand, limestone and blue rock) deflection had formerly made it necessary to drill 2 to 3 times to complete each hole.

Changing to a Jaeger rotary compressor stopped this loss. "*Not only is drill penetration 10% to 20% faster than with any compressor we had previously used,*" foreman Fred Ball states, "*but where it used to be necessary to drill 2 to 3 times, once is now enough. This saving of half to two-thirds of the drilling, and the faster penetration averaging a foot per minute, both result from the consistent air pressure maintained, regardless of soil condition, by our Jaeger rotary.*"

"*We change oil in the compressor unit every 500 hours and every 100 hours in the engine. No oil is added between changes. We average 2 gallons of gas in 8 hours. This Jaeger has been used 550 hours and we think it is the best compressor we have ever owned.*"

• • • • • • • •

Jaeger rotaries have great advantages for utility work. Their constant pressure holds tools at top efficiency; their slower speed of operation gives you lowest fuel and upkeep costs. Full load speed is only 1700 rpm compared with usual 1800 rpm and even as high as 2150 rpm in other makes. Two-wheel mounted 85, 125 and 250 cfm models have full-size tool boxes, wrap-around bumpers, retractable pneumatic tired third wheel and 8-hour fuel tanks as standard equipment.

For complete cost-saving data and demonstration, call your Jaeger distributor — or send for Catalog JCR 8.

JAEGER
MACHINE COMPANY
661 Dublin Avenue, Columbus 16, Ohio
Jaeger Machine Company of Canada, Ltd.,
St. Thomas, Ontario

for Super-Service Requirements...in Gas Service

American Ductile Iron Pipe

Where deep covers and unstable bedding impose severe crushing or bending loads, AMERICAN DUCTILE Iron pipe, equipped with the standardized AMERICAN Double-X Mechanical Joint, is ideal for gas service.

AMERICAN DUCTILE Iron combines the many advantages of cast iron with increased ductility and other mechanical properties similar to those of steel. Under abnormal stresses, it may actually bend without breaking!

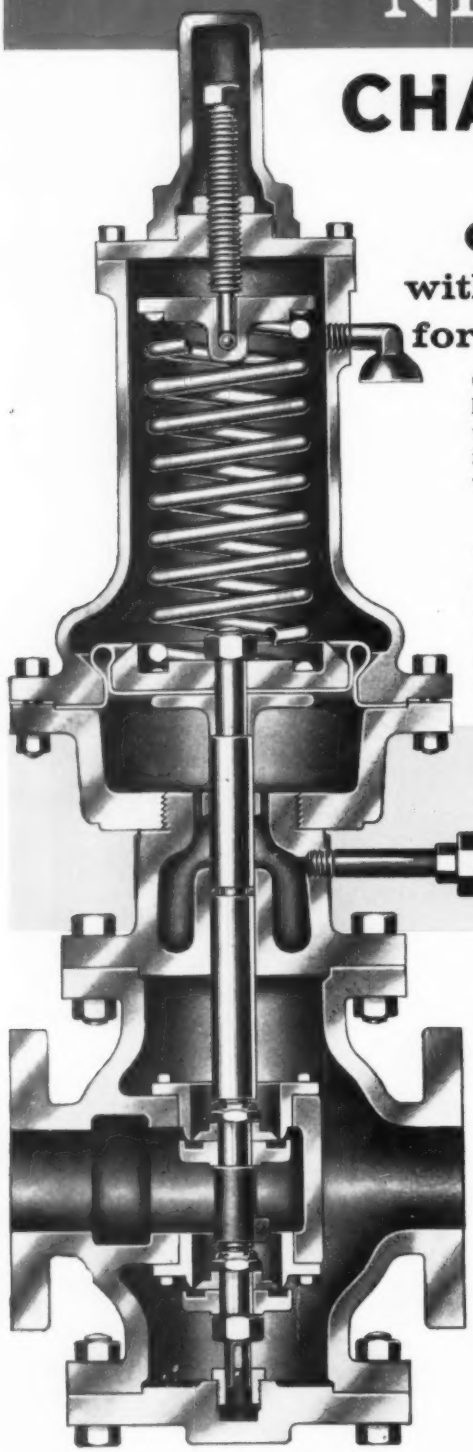
The inherent corrosion resistance of cast iron insures maximum long life without the expense and inconvenience of special wrappings. AMERICAN DUCTILE Iron pipe has ample wall thickness which permits tapping into the pipe wall without saddles or welding, although service connections may be easily welded on if desired.

Write now for the new illustrated brochure which shows why AMERICAN DUCTILE Iron pipe can best meet the *super-service* requirements of the gas industry. Your nearby American Cast Iron Pipe Company representative will be glad to supply full details.

AMERICAN
CAST IRON PIPE CO.
BIRMINGHAM ALABAMA

SALES OFFICES
New York City • Dallas
Chicago • Kansas City
San Francisco • Denver
Pittsburgh • Orlando
Minneapolis • Cleveland
Birmingham

NEW IN PRINCIPLE!
NEW IN DESIGN!



CHAPLIN-FULTON

Model 57-S

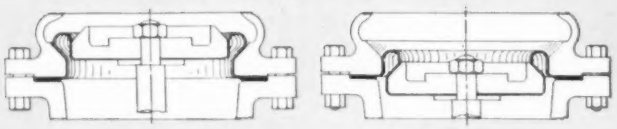
GAS REGULATOR
with "ROLL-OUT" Diaphragm for constant pressure control

Chaplin-Fulton Model 57-S is a simple spring loaded regulator which performs like a pilot loaded regulator, without the added complications. For pounds-to-pounds service—inlet pressures to 400 psi—controlled pressures to 75 psi, with deviation through full valve travel less than 1 psi.

NO "FALL-OFF" AS FLOW INCREASES

The drooping characteristics or outlet pressure "fall-off", typical of conventional spring regulators, is eliminated—not by using an uncontrollable velocity effect—but by a new diaphragm design which actually reverses the action of a conventional diaphragm. It changes its area as the valve opens to compensate for the loss in spring loading force.

"ROLL-OUT" DIAPHRAGM PRINCIPLE



VALVE CLOSED VALVE OPEN

Note how, with the valve upwards in the closed position, the diaphragm achieves its maximum effective area—and decreases as the valve opens. The area changes at the same rate as the spring loses compression, to give a constant controlled pressure—determined entirely by valve movement.

2" - 3" - 4" - 6"

Write for Bulletin 57-S

ACCURATE CF MFG CO DEPENDABLE

Chaplin-Fulton

MANUFACTURING COMPANY

Pittsburgh 25, Pennsylvania

NEW! FORD

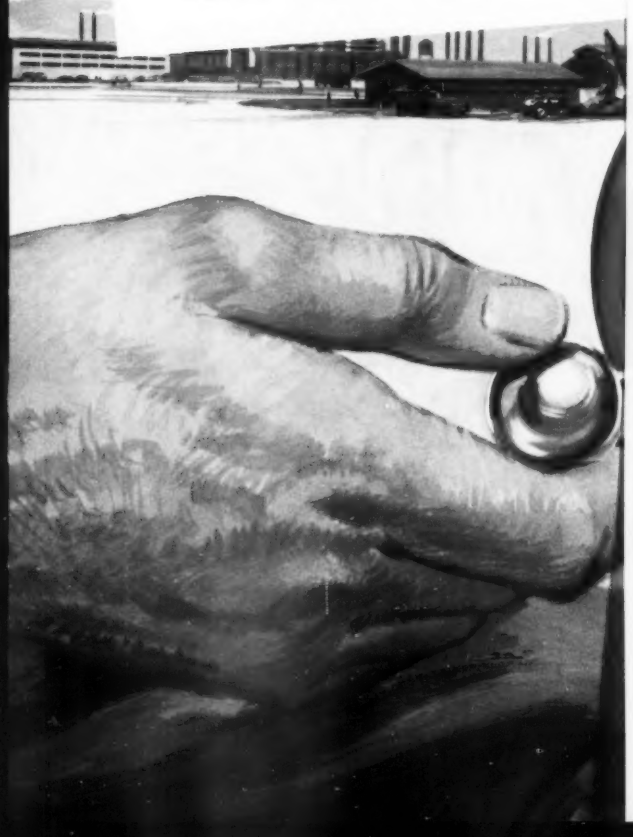
SELECT-O-SPEE

10 SPEEDS FORWARD; 2 REVE

Now, with Ford industrial tractors, you can
to *any* speed under full load and on-the-go! A
touch on the Select-O-Speed lever is all you
to select instantly the right gear to meet cha
operating conditions. There's no clutching re
to start, stop, change gears, or to engage
engage PTO. There's no conventional gea
You merely move the selector for the desired
Hydraulic power does the work of shifting.

New Ford Select-O-Speed will save you tim
you fuel, save you effort. And because y
instantly shift up or down according to vary
conditions—on-the-go and without loss o
or momentum—you'll handle bigger jobs
tractor power range. Select-O-Speed tran
is available for all series of Ford tractors

AND ONLY FORD HA



NOW!

Shift to any speed

on the GO!

NEW! FORD SELECT-O-SPEED

10 SPEEDS FORWARD; 2 REVERSE

Now, with Ford industrial tractors, you can shift to *any* speed under full load and on-the-go! A light touch on the Select-O-Speed lever is all you need to select instantly the right gear to meet changing operating conditions. There's no clutching required to start, stop, change gears, or to engage or disengage PTO. There's no conventional gear shift. You merely move the selector for the desired speed. Hydraulic power does the work of shifting.

New Ford Select-O-Speed will save you time, save you fuel, save you effort. And because you can instantly shift up or down according to varying job conditions—on-the-go and without loss of power or momentum—you'll handle bigger jobs in every tractor power range. Select-O-Speed transmission is available for all series of Ford tractors . . .

AND ONLY FORD HAS IT!

Greatest Industrial Tractor Advance Since Hydraulics!

LOADING AND BACKFILLING—A touch moves the selector lever to pre-selected stops for easy back-and-forth shifting. You eliminate *five* clutch and gear shift movements every time you move from pile to truck to pile. Down-shift on-the-go as you buck into the pile. Break out heaped payloads every time!

GRADING AND LEVELING—Down-shift in a wink without loss of forward motion when you hit tough spots. As the load eases, shift up again for more speed, more fuel economy. Pull high spots into low ones with quick shuttle-type passes. Use Ford's low, low speeds for more "push" when needed, and for smooth, uniform finish work.

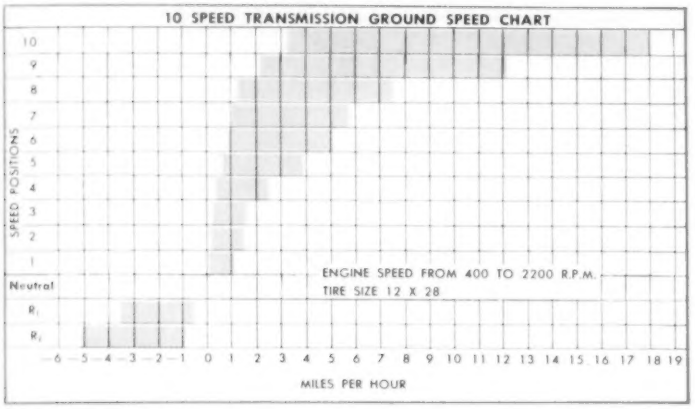
SNOW REMOVAL—With Select-O-Speed you have easy shifting to powerful low gears for big drifts, and to higher, fuel-saving gears when the going is easy. Extra safety is at your finger tips, too, with Select-O-Speed brake assist for stopping on ice.

Design, materials and or specifications are subject to change without notice and without liability therefor.

SELECT-O-SPEED DETAILS, BACK PAGE ☛

COPYRIGHT 1959, FORD MOTOR COMPANY

MATCH SPEED AND POWER INSTANTLY FOR PEAK EFFICIENCY



Select-O-Speed lets you instantly choose the exact combination of ground speed and tractor power for top efficiency and fuel economy—not just for the job, but for minute-to-minute variations in operating conditions. Generous overlapping of the 10 forward and 2 reverse speeds at different engine speeds makes it possible to get the desired ground speed in several different gears.

EXTRA SLOW SPEEDS—Creep along as slow as .6 mile per hour at 1200 rpm. A finger touch calls forth extra power for tough spots. And you'll give precision work the look of a hand finish!

UP TO 18 MPH—Fast travel for light towing jobs, highway transport, etc. Select-O-Speed provides extra safety at fast road speeds. You down-shift on-the-go without clutching.

SEE *SELECT-O-SPEED* FOR YOURSELF . . . AND LOOK FOR THESE FEATURES

QUICK-CHANGE LEVER—Selector lever can be changed to left or right side in less than a minute—an added convenience for loader work.

ADJUSTABLE STOPS—Pre-select any of five gears and set stops for the ones desired in shuttle operations. Stops are easily bypassed for other speeds.

INCHING CONTROL—Foot pedal operates feathering valve which lets you inch forward or backward for attaching equipment, doing precision work, or starting heavy tow-loads smoothly. It also interrupts power for emergency stops.

NO "RUNAWAYS"—Rear wheels lock when selector is in "Park" position or when engine is off. You can safely leave the tractor, even on a slope.

TRANSPORT DISCONNECT—Prepared in less than a minute to be towed from job to job at regular truck speeds.

INDEPENDENT PTO—Separate power take-off handle gives easy control of mowers, rotary cutters, etc. PTO is completely independent of gear ratio change and forward movement of tractor and can be gradually engaged.

SELECT-O-SPEED RANGE, MPH			
	Engine RPM		
Gear	1200	1750	2200
10	9.8	14.3	18.0
9	6.7	9.7	12.1
8	4.1	6.0	7.5
7	3.2	4.6	5.8
6	2.8	4.0	5.1
5	2.1	3.1	3.9
4	1.3	2.0	2.5
3	1.0	1.4	1.7
2	.9	1.3	1.6
1	.6	.9	1.2
Neutral	—	—	—
R1	1.9	2.8	3.5
R2	2.8	4.1	5.1
Park	—	—	—

Handle Bigger Jobs in Every Tractor Power Range . . . And at Less Cost!

EXTRA DRAWBAR PULL—You can *double* your pull power merely by changing from 6th to 4th gear. Moving from 10th to 4th increases your power *8 times!* Start extra-heavy loads in a low gear; shift up as your tractor gains momentum. Shift down on-the-go through tough spots; up again when the work eases.

MATCH TO LIGHT LOADS, TOO—Save on fuel, on tractor wear by selecting higher work gears and throttling engine back to a lower rpm. Just look at the overlapping range of speeds in the table and graph above.

FAST, SAFE HIGHWAY HAULING—Start smoothly with your inching control . . . down-shift on-the-go for extra power as you climb the hills, and for brake assist as you come down. Bigger, faster, safer hauling—and all the while it "babies" your tractor!

What is SELECT-O-SPEED?

What makes Ford Select-O-Speed unique and boldly different from any transmission ever seen in industrial tractors is the way its four-stage planetary system is controlled—by hydraulics. Select-O-Speed offers manual gear or speed selection, "solid drive" and the other advantages of a gear type transmission, and also the time- and effort-saving advantages of hydraulic power shifting of that transmission.

Select-O-Speed is the world's most advanced tractor transmission . . . stronger because there is three times as much gear tooth contact as in conventional transmissions . . . silent because helically cut gears are always in mesh, can't clash . . . efficient because there is no slipping, no appreciable power loss . . . simple to operate, one lever changes speeds . . . economical, saves time, fuel, and effort.

Seeing is believing. *Trying* is even better. Visit or phone your Ford Tractor and Equipment Dealer right now to arrange a demonstration of Select-O-Speed on the Ford tractor of your choice, or write to Ford Industrial Sales Department, 2500 East Maple Road, Birmingham, Michigan. You'll agree the new Ford Select-O-Speed transmission is the greatest tractor advance since hydraulics!

C-7292 TRACTOR AND IMPLEMENT DIVISION, FORD MOTOR COMPANY, BIRMINGHAM, MICHIGAN PRINTED IN U.S.A.

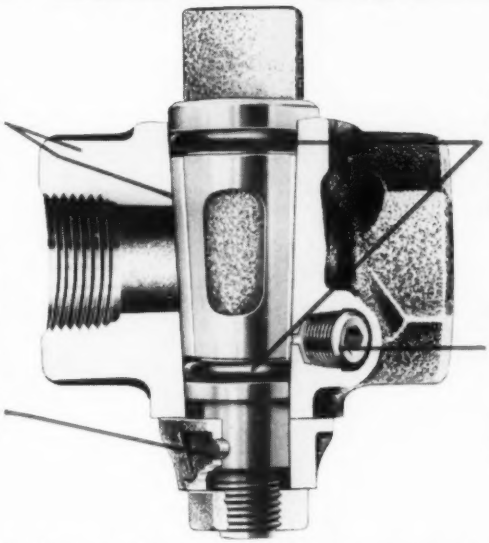
Now . . . a full line!

MUELLER®

125 pound LubOseal® *stops*

Iron body and bronze key—ground and lapped to perfect fit prevents leakage through the port.

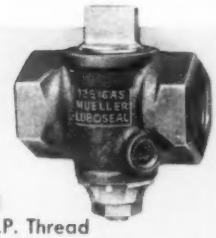
Heavy bronze washer secured to key by steel drive-lock pin in blind hole to permanently maintain perfect adjustment between key and body and to prevent tampering. Stop safely operable without nut.



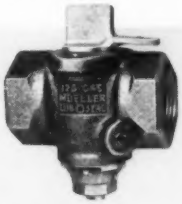
"O" rings at top and bottom of key provide dependable seal to prevent leakage to the atmosphere.

Entire sealing surface and both "O" rings quickly and easily re-lubricated through independent port in body. Assures continuous easy turning.

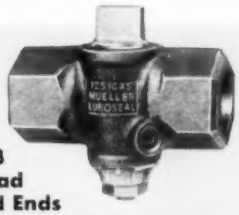
iron body, bronze key—working pressures to 125 psi



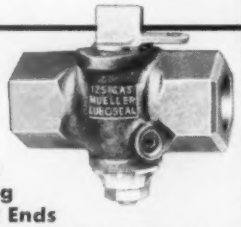
H-11170
Plain Head
Inlet: Inside I.P. Thread
Outlet: Inside I.P. Thread
Finish: Black or Galvanized
Sizes: ¾", 1", 1¼", 1½", 2", 2½"



H-11175
Lock Wing
Inlet: Inside I.P. Thread
Outlet: Inside I.P. Thread
Finish: Black or Galvanized
Sizes: ¾", 1", 1¼", 1½", 2", 2½"



H-11173
Plain Head
Recessed Ends
Inlet: Recessed Inside I.P. Thread
Outlet: Recessed Inside I.P. Thread
Finish: Black
Sizes: ¾", 1", 1¼", 1½", 2"



H-11178
Lock Wing
Recessed Ends
Inlet: Recessed Inside I.P. Thread
Outlet: Recessed Inside I.P. Thread
Finish Black
Sizes: ¾", 1", 1¼", 2"

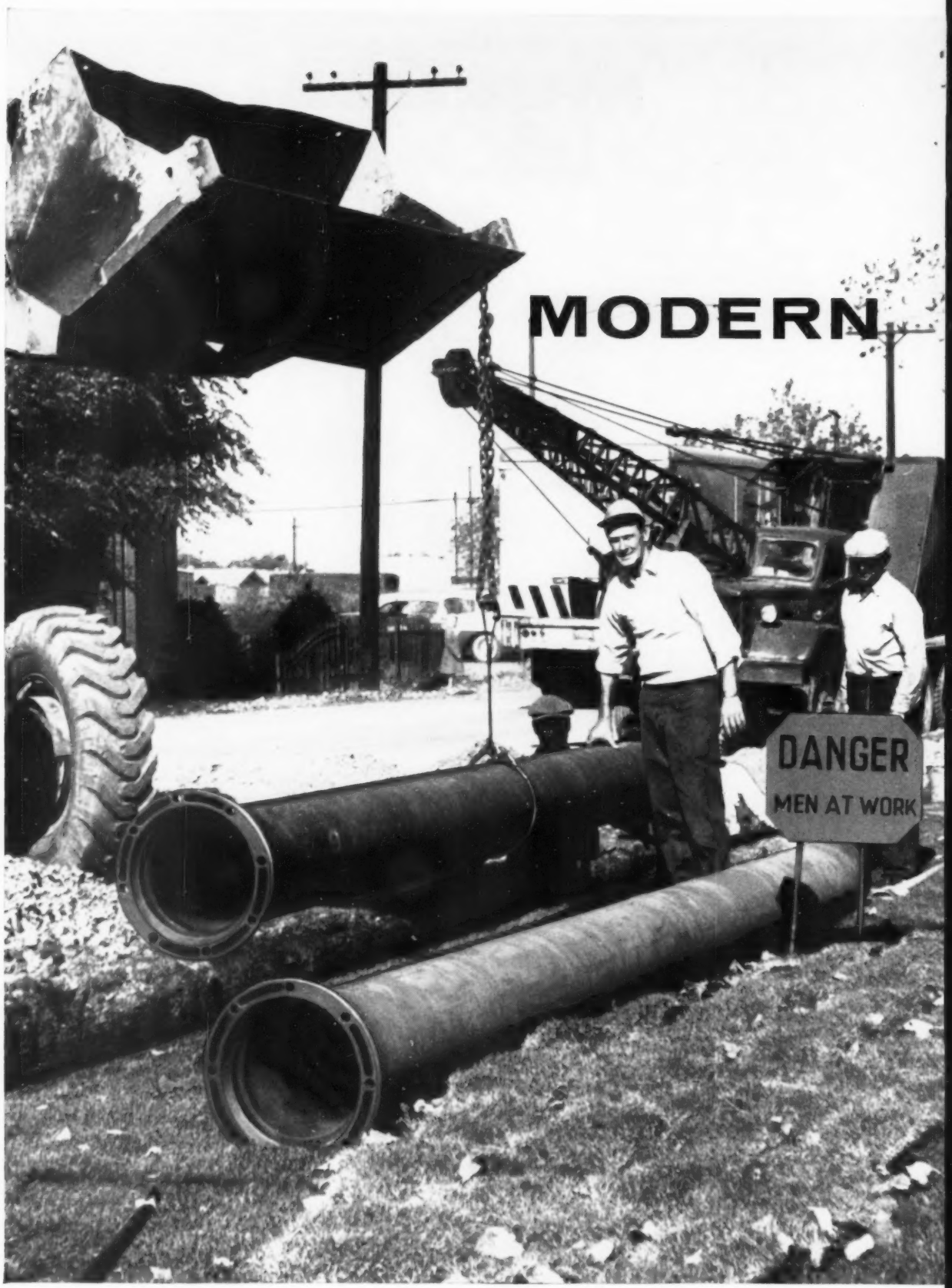
New! H-11199
Re-lubricating Tool
Simple, handy tool for re-greasing all LubOseal Stops to restore original turning ease. Tool is screwed into grease port of stop and handle turned — that's all there is to it! Convenient H-853 Grease Sticks just fit tool to eliminate waste.

NO-BLO®

The features of these products are typical of the attention to detail in research, design and engineering that becomes a part of every Mueller No-Blo product manufactured for the gas industry. Write for complete information.

GEM Gas Equipment Manufacturers Group Member

MUELLER CO.
DECATUR, ILL.


MODERN
DANGER
MEN AT WORK

Fill your needs for a century

CAST IRON PIPE

Once in a while a product comes along that is good enough to fill your needs for 100 years and more.

Modern cast iron pipe gives you this reassurance with an unchallenged record of longevity—in dozens of cases, more than 100 years of trouble-free service, a performance unequaled in the gas field.

Improved, modern cast iron pipe gives you even more assurance for the 100 years ahead. Mechanical joints stay bottle-tight through heavy top loads or washouts. Ruggedly constructed cast iron pipe resists a pressure of nine tons per foot in six-inch size, for instance. Even congested overhead traffic won't affect it.

And you needn't worry about corrosion, either—long-lasting corrosion resistance is an outstanding feature of modern cast iron pipe. Convenient lengths make installation easy in even the most cramped quarters.

...All good reasons for you to choose

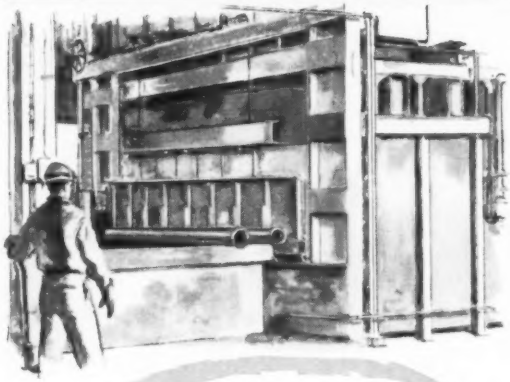
CAST IRON PIPE

THE MARK OF THE 100-YEAR PIPE

Write for complete information to Cast Iron Pipe Research Association, Thos. F. Wolfe, Managing Director, 3440 Prudential Plaza, Chicago 1, Ill.

THE BLACKSMITH . . . legendary figure of other days, heated his metals in a crudely built forge.

BASIC...but better than ever today



TODAY . . . dependable gas supplies heat for thermostatically controlled heat treating furnaces such as used for our cast iron pipe.

Cast iron pipe's reputation for long life was won the hard way—by proved performance in the field.

Throughout the country today many cast iron gas mains, a century and more old, are still serving.

This outstanding record is the result of cast iron's inherent quality. Quality that we, for one, maintain at maximum levels by supervising every production step from mine to finished product.

You can depend on U. S. Pipe. It is quality-controlled in manufacture to insure top performance in the main.

SERVICE IS BUILT INTO CAST IRON

- Standardized mechanical joints are bottle-tight for usual gas distribution pressures . . . and for all types of gas.
- Centrifugally cast pipe is tough, strong and uniform.
- Joint design allows for deflection during and after installation.
- Service connections are easily made
- Long life a matter of record.
- No shortages. Cast Iron Pipe is immediately available.

U. S. PIPE AND FOUNDRY COMPANY
General Office: Birmingham 2, Alabama

A WHOLLY INTEGRATED PRODUCER FROM MINES AND BLAST FURNACES TO FINISHED PIPE.

U.S. cast iron PIPE
CAST IRON

GEM

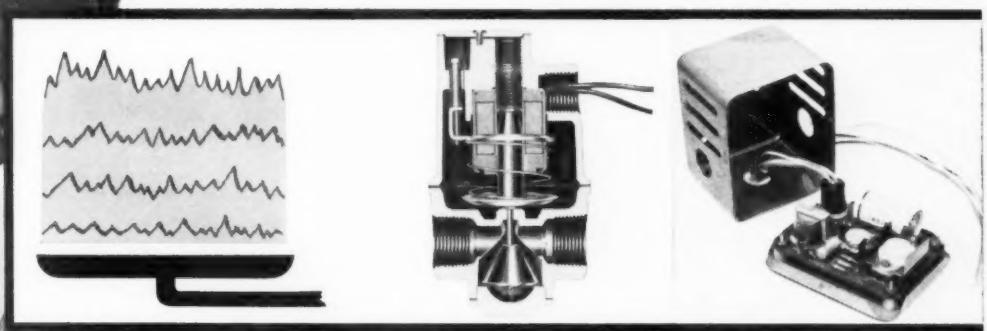
one setting...one tenth...one second

Selectra

ELECTRONIC MODULATION

One setting of the Selectrastat in the living area brings a whole new mode of comfort for the whole heating season. For, with an eye on heat loss, the Selectrastat senses temperature changes of one-tenth degree or less. In just one second, the Selectra system modulates the furnace flame—either up or down—to compensate for the change. Selectra enables delivery of steady, non-cyclic heat on cold days—mild days.

No wonder that householders—tired of hot blasts and cold air pockets—see in Selectra the answer to discomfort in gas fired forced air systems. Better investigate: you'll see the same, in terms of upgrading and increased sales, too.



INFINITE, INSTANTANEOUS FLAME ADJUSTMENT—Selectra infinitely modulates the flame from full input to ⅓ input. It's not just a "full fire—low fire" system.

REGULATES AND MODULATES—The Selectra valve replaces the conventional manifold regulator—does double duty as a regulator and a modulator in response to Selectra signals.

ALL ELECTRONIC—A printed circuit amplifier boosts signals from the Selectrastat to energize the valve. Two models—transistorized or thyratron-controlled—are available.

FOR THE ASKING—The whole story on Selectra electronic modulation, in a detailed 8-page brochure just off the press. Drop a card or letter, wire or phone MAXITROL COMPANY, 12200 Beech Road, Detroit 39, Michigan.

In Canada: EMCO-UNIVERSAL (CANADA) LIMITED • HONEYWELL CONTROLS LIMITED (offices in principal Canadian cities.)

MAXITROL

ROYAL PRECISION

Electronic digital computer solves distribution problems on networks of up to 1000 pipe sections and 400 loops by Hardy Cross method

Gives you optimum level efficiency in distribution, transmission, storage!

Operating from any convenient wall outlet, the compact, powerful LGP-30 is used at *desk-side* for the solution of such problems as network distribution, gas reservoir calculations for storage and production wells, high pressure gas transmission studies, mechanical design of pipelines and compressor stations. Result: you get the fast, accurate answers you need to insure peak operating efficiency. And at the lowest cost ever for a complete computer system!

Combining large memory (4096 words) and stored-program operation, the LGP-30 gives you twice the capacity of any computer in its class . . . is by far the easiest to program in basic machine language. Answers are printed out directly—require no deciphering. What's more, auxiliary high-speed input-output equipment is available for system expansion.

No expensive installation or air-conditioning required. Customer training is free. An extensive library of programs and sub-routines is available—as well as membership in an active users organization. Sales and service facilities are maintained coast-to-coast.

For further information and specifications, write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y. In Canada: The McBee Company, Ltd., 179 Bartley Drive, Toronto 16.

• *data processing division*

pipe protection for the future . . .

assured by pipewrapping craftsmen

An essential requirement for the best in coated-and-wrapped pipe is skilled, conscientious craftsmanship. It takes fully trained men who have devoted their lives to this work.

Hill-Hubbell has hundreds of these men. They are permanent employees, working under carefully controlled conditions in four modern plants. Their experience in cleaning, priming, coating-and-wrapping, inspecting and shipping pipe can mean extra protection for your pipelines, now . . . and in the future!

The best pipe protection is the most economical in the long run, so specify Hill-Hubbell — the name synonymous with quality in coated-and-wrapped pipe.

Specify Hill-Hubbell wrapped pipe on your next job . . .

HILL·HUBBELL

FACTORY APPLICATORS OF COATINGS AND WRAPPINGS

HILL-HUBBELL & CO. • 3091 MAYFIELD RD. • CLEVELAND 18, OHIO

GEM SELLS GAS...

No more dog days...!
Plenty of hot water... all the time!
GAS
when does the 7 big household jobs AUTOMATICALLY
The only litter allowed...
my GAS incinerator burns all the rest

GAS EQUIPMENT MANUFACTURER'S GROUP

GEM

MEMBER

GAS is 7 ways better for the 7 big household services

GAS is 7 ways better for the 7 big household services

Helping the Gas Industry—
and everyone in it—
to grow and prosper!

FREE

reprints and newspaper mats of National Consumer Advertisements, for use by Gas Utilities and LP-Gas Marketers, are available. GEM price tags, with room for appliance prices and terms, can be obtained at $10. per 1000.

MR. SUPPLIER:

It takes *dollars* and *sense* to run the GEM program of national advertising. GEM advertisements in consumer magazines—Saturday Evening Post, Better Homes and Gardens, New Homes Guide and Home Modernizing—sell GAS, GAS appliances and GAS equipment. They build business for every part of the GAS industry.

Won't you do your share to ensure a fabulous future for the GAS industry by helping to underwrite the GEM program?

What's in it for you? Consistent growth and prosperity as *your* customers expand and flourish.

Join GEM today! Write GEM Committee, Room 2925, 60 E. 42nd Street, New York 17, N. Y.

These 15 sponsors are underwriting the GEM 1959 program of national advertising:

American Cast Iron Pipe Co.
American Meter Co.
Cleveland Trencher Co.
Fisher Governor Co.
E. F. Griffiths Co.
Koppers Co. Inc.
Mueller Co.
Pipe Line Service Co.
Rockwell Manufacturing Co.
M. B. Skinner Co.
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Superior Meter Co.
Subsidiary of Neptune Meter Co.
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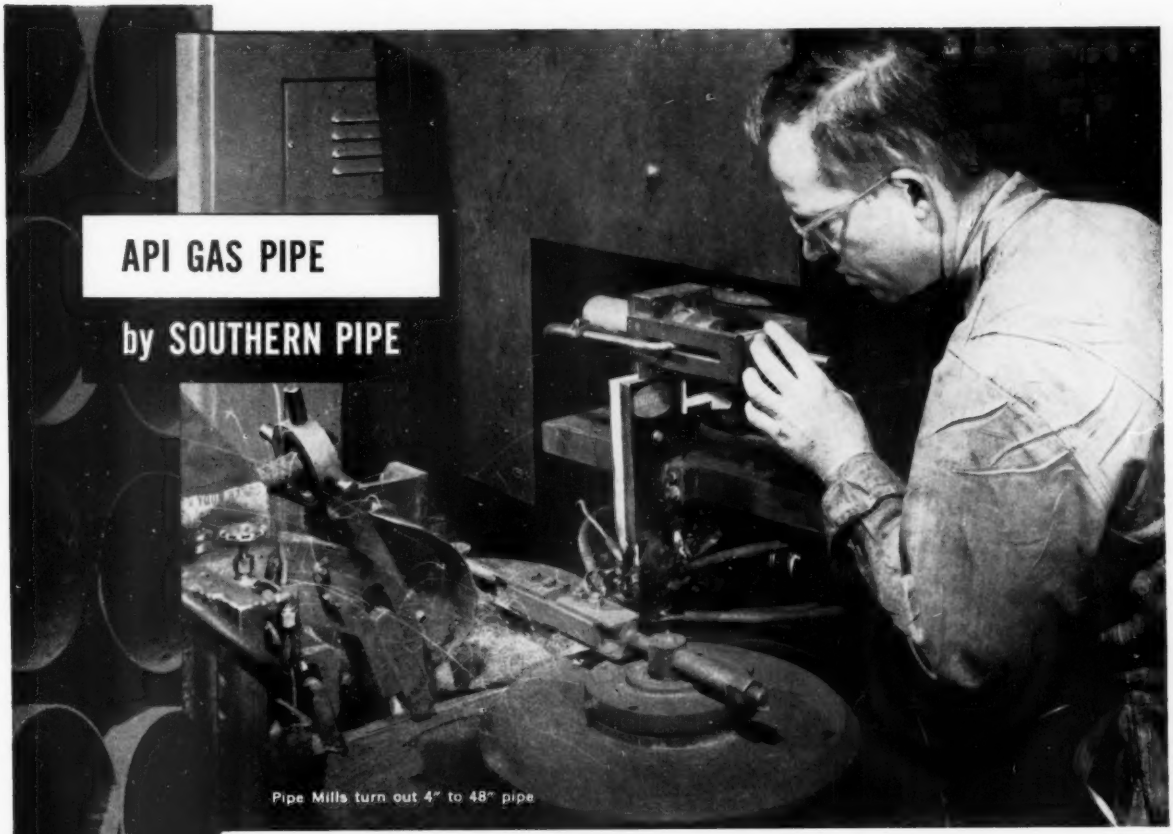
U. S. Pipe and Foundry Co.
Vulcan Rubber Products
Division of Reeves Brothers, Inc.



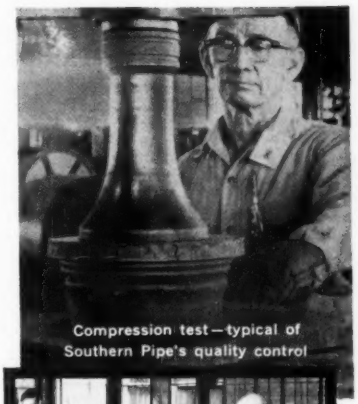
Pipe Mills turn out 4" to 48" pipe

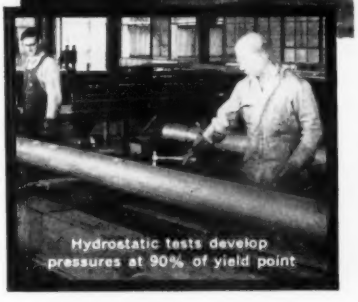
NOW—HIGH-FREQUENCY WELDING PRODUCES BETTER GAS PIPE

Southern Pipe was the **first producer** of API approved gas pipe, and API quality thin-wall gas pipe, fabricated by means of Thermatool HIGH-FREQUENCY welding. And, **only** Southern Pipe can give you the better welds that are produced under HIGH-FREQUENCY welding.

Here's what Southern Pipe offers gas pipe users: (1) Fully normalized weld; (2) A weld stronger than the pipe itself; (3) Only minor metallurgical change in material adjacent to weld; (4) Thin-wall high strength at less cost per foot.

Write for Stanford Research Institute's Report on HIGH-FREQUENCY welding


Compression test—typical of Southern Pipe's quality control


Hydrostatic tests develop pressures at 90% of yield point

USI

Southern Pipe

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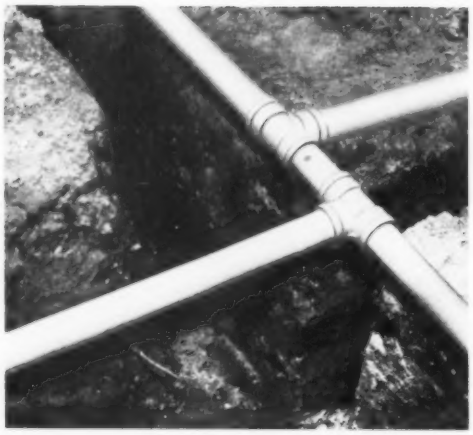

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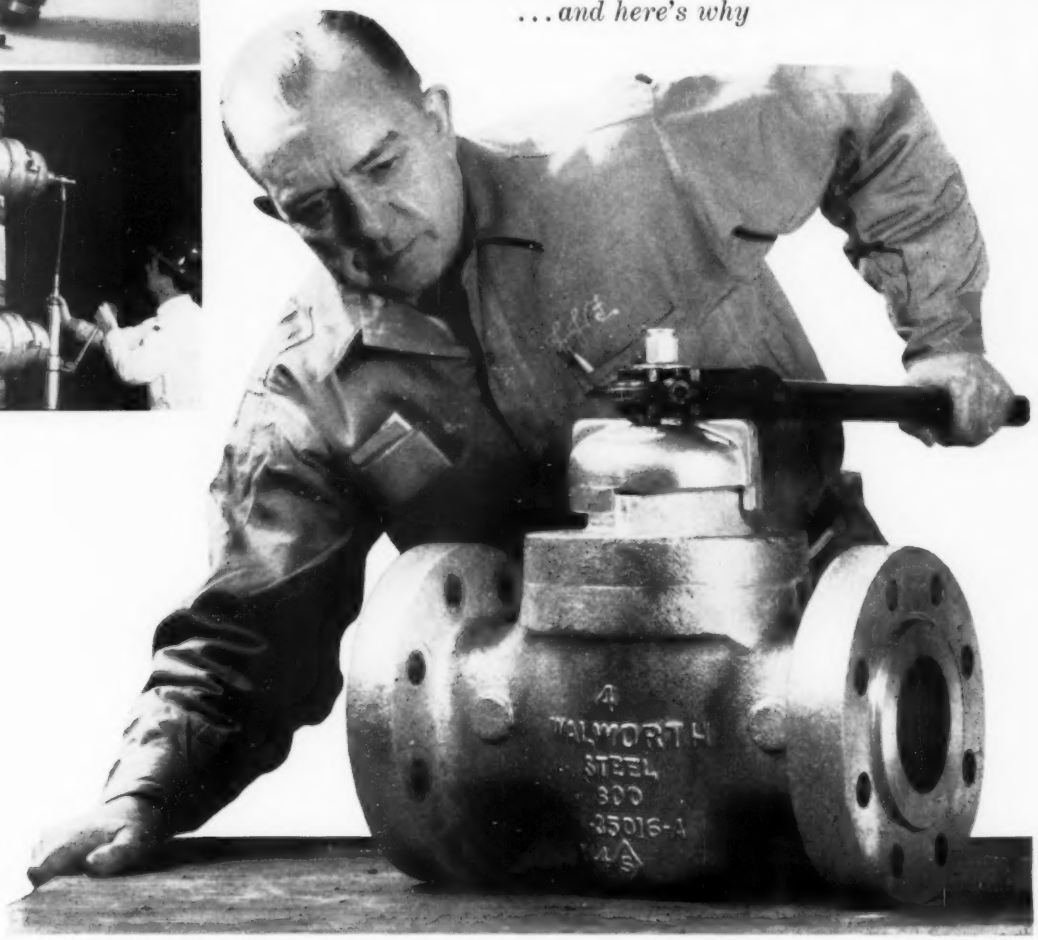

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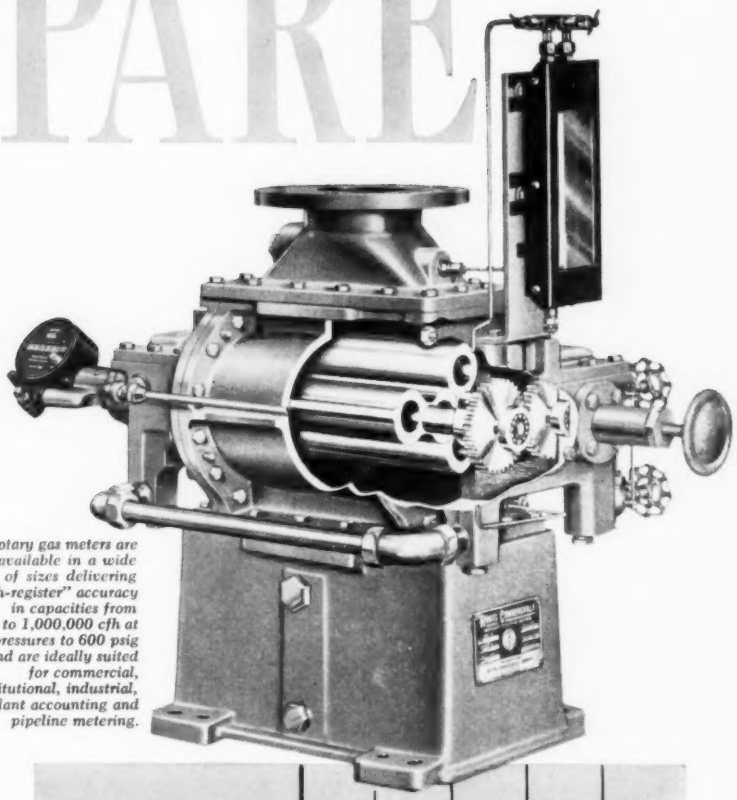

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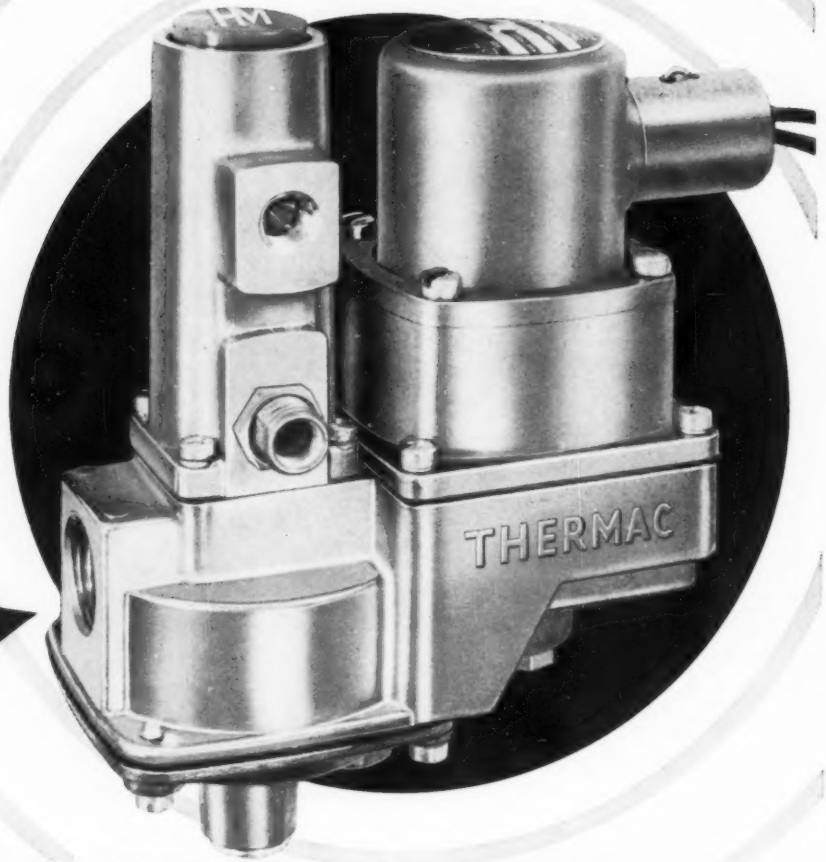

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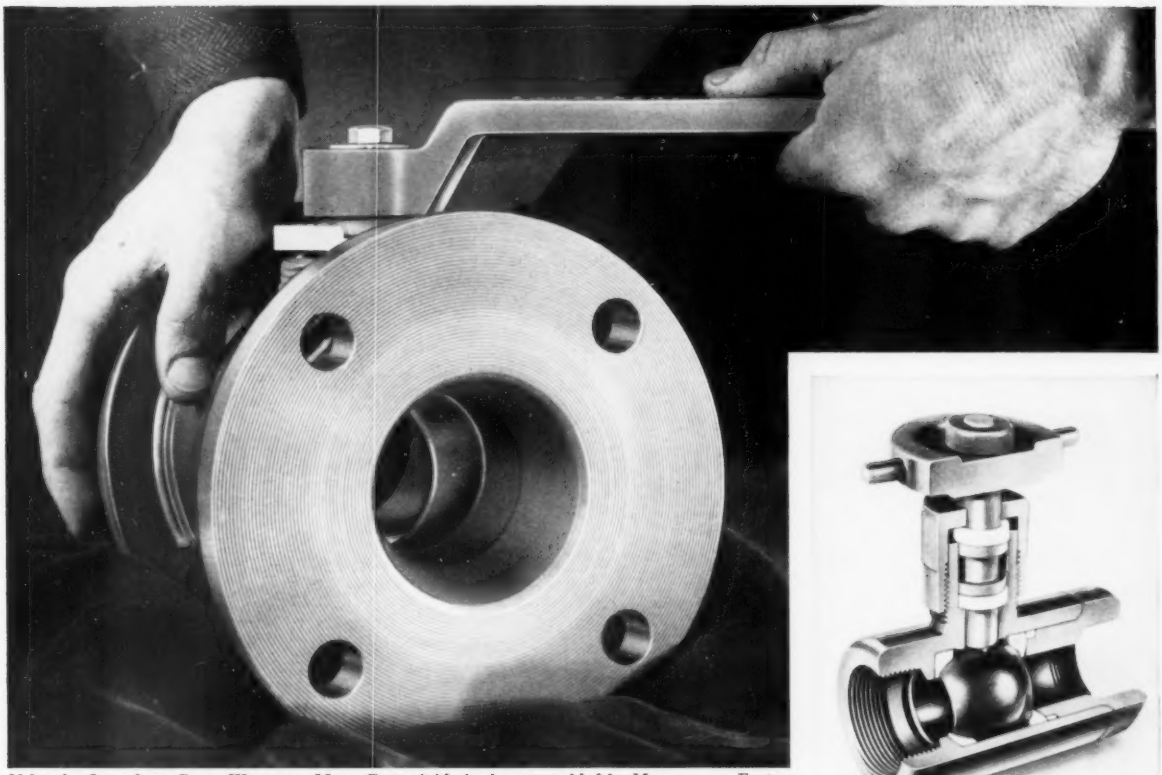

Valves by Jamesbury Corp., Worcester, Mass. Geon rigid vinyl parts molded by Mannesman-Easton Plastic Products, Inc., Easton, Pa. Valves in sizes from 1/2" to 4", shown in large photograph, are rated at 150 psi to 100 F. and at 50 psi to 130 F. They can be remote operated. B.F.Goodrich Chemical Company supplies the Geon rigid vinyl material only.

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GAS

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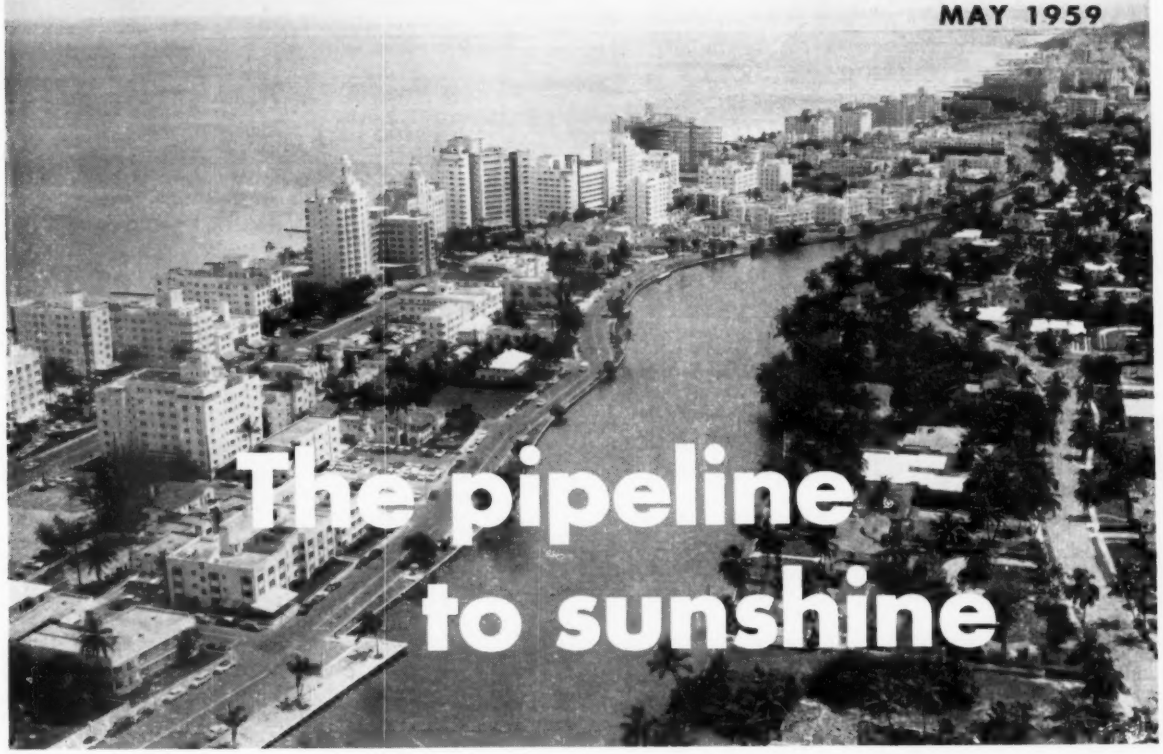


The pipeline to sunshine

By J. FRED EBDON, Editor

GAS staff report

DURING post-war years, many nooks and corners of the nation were ferreted out as natural gas markets. Relentlessly, natural gas pipelines were built into these areas. Somehow, peninsular Florida resisted the progression of transmission systems that brought natural gas to so many other gas-hungry states.

Several well-established pipeline companies—and other interests with natural gas on their minds—took a look at Florida years ago. United Gas Pipe Line Co. (Shreveport) did push natural gas into the state at Escambia county to make town border sales at Pensacola and to serve any industrial customers in, or to be in, that locality. Also, Tallahassee and some nearby communities are served natural gas from a South Georgia Natural Gas Co. line that drops down from Southern Natural's vast system.

Several gas companies let their gaze linger long enough on the peninsular portion of Florida to make preliminary feasibility studies. However, consensus results were that a pipeline project to the heart of Florida represented a proposition that was just too thin.

The builders

F. E. STANLEY
Chairman of the Board and President of The Houston Corp. and Houston Texas Gas & Oil Corp. and Chairman of the Board of Coastal Transmission Corp.

What they saw was a pretty poor economy. The basic business was built around winter tourists. There were more pines than palms on the scene; scrub cattle ranged over a good portion of the state; industrial development was spotty; and the climate did not make seasoned gasmen turn handsprings. It has been said that until after World War II everybody in Florida prospered in the winter season and either went to North Carolina in the summer or went hungry.

However, other men saw a different future for Florida. Perhaps they saw a new Florida. Escambia county, the most westward, may have been the tip-off. The availability of natural gas (and water) in the West Florida county attracted industry—something badly needed in every other county in Florida in the early 50's, and still needed in many.

One man who early saw the possibilities of a natural gas project to bring this source of energy to a large section of Florida was the late J. O. Mack. He proposed what some term a grandiose plan to build 30-in. lines from east Texas into Minnesota via Chicago and from south Louisiana to New York, the latter taking a devious swing through central Florida and Georgia en route. This plan was changed during March 1954 and further modified in late summer of that year.

About June or July of 1954, a group headed by Floyd E. Stanley—a pioneer pipeliner, industrialist, and leading citizen of Tulsa—was given an outline of the plans and organization of Houston Texas Gas & Oil Corp., and asked to join in bringing that project into reality.

Mr. Stanley and Paul Wallack (Walco Engineering & Construction Co., Tulsa) met on several occasions with J. O. Mack, O. Paul Herzig, C. C. Barnard (Barnard & Burk, consulting engineers, Baton Rouge) and others interested in the Houston Texas Gas & Oil plans. Stanley's interest in the potential for natural gas in the then rapidly growing state of Florida was quickly brought into the open. However, he did stipulate to Mr. Mack (whose project was well bogged down) that there was one man needed in the group before he would take on this project. That was Theodore Rinehart, Tulsa and Washington attorney, long experienced in natural gas matters. Ted Rinehart agreed to join the promotion phase. John M. Harbert III (Harbert Construction Co., Birmingham) and James Roddy of New Orleans also joined the project. For the first time, plans for a natural gas pipeline to the heart of Florida really began to jell.

Mr. Stanley approached the project with his characteristic vigor. One of the very first moves was to get with Charlie Barnard and "walk over the country." Thus, several tours of the entire right-of-way were made by automobile and aircraft. In Florida they sat down and talked with public officials, key people in local manufactured gas distribution companies, industrial figures, state and local chambers of commerce, and other civic organizations.

It was quickly learned that: (1) the key to a Florida natural gas project was an industrial load, (2) that the state was dependent upon one primary fuel—fuel oil—for its industrial economy. Yet the state had everything else needed for future industrial development—labor, transportation, available land, and water supply. Needed: abundant energy in a convenient form at a reasonable price.

For practical considerations, Florida has no energy production of its own. The primary basic source of

W. J. BOWEN
Senior Vice President of The Houston Corp., Vice President of Houston Texas Gas & Oil Corp., and president of Coastal Transmission Corp.

DWIGHT B. SPROW
Executive Vice President, Houston Texas Gas & Oil Corp. and Coastal Transmission Corp.

O. PAUL HERZIG
Vice President, Engineering, The Houston Corp., Houston Texas Gas & Oil Corp., and Coastal Transmission Corp.

G. B. BENNETT
Vice President, Operations and Sales, The Houston Corp., and Vice President, Sales and Supply, Houston Texas Gas & Oil Corp.

J. B. ZACHRY
Compressor Station Superintendent, Houston Texas Gas & Oil Corp. and Coastal Transmission Corp.

DON A. HARDESTY
Pipeline Superintendent, Houston Texas Gas & Oil Corp. and Coastal Transmission Corp.

energy, aside from gasoline used for mobile applications, has been fuel oil, kerosene, diesel oil and LPG. Actually, fuel oil has dominated. And one might as well say that non-gasoline energy requirements for Florida have been entirely dependent on fuel oil which has been on an average straight-line price increase for the past 20 years.

Since electric power generation was also dependent on this expensive energy source, except for three small hydro-electric projects, electricity can be classed as scarce and the production cost exorbitantly high. This was part of the picture that exploratory trips revealed. There were some 18 existing gas systems in the area that Houston Texas Gas & Oil proposed to serve during its formulative period. These companies were distributing either manufactured gas or LPG-air. Some had straight LPG operations beyond their mains. Probably a few more than 150,000 customers had gas service. As mentioned, Pensacola and Tallahassee are served with natural gas. These areas did not figure in Houston Texas Gas' plans.

The gas systems in peninsular Florida at the time of the inspections and market studies were pretty antiquated. Their distributed fuel was highly priced. Service was limited and generally poor by comparison with gas utility service in other parts of the

TABLE I. DISTRIBUTION PROPERTIES ACQUIRED BY THE HOUSTON CORPORATION

(Population of their gas service areas, number of customers now served utility gas and estimated number of residential, commercial and industrial customers to be served in each of the first three years of natural gas operation)

Description of existing properties	*Estimated Population gas service area—1959*	*Now served utility gas*	*CUSTOMERS*					
			First year of natural gas operation		*Second year of natural gas operation*		*Third year of natural gas operation*	
			New	*Total*	*New*	*Total*	*New*	*Total*
Jacksonville Gas Corp. (mfd.)	433,000	12,789	12,211	25,000	5,000	30,000	4,200	34,200
South Atlantic Gas Co. (mfd.)	134,000	8,459	10,625	19,034	3,734	22,818	4,278	27,096
Florida Power & Light Co. gas properties:								
Miami, Coral Gables, South Miami, West Miami	440,000	20,103	17,317	37,420	13,440	50,860	10,150	61,010
Lakeland	43,700	3,189	3,090	6,279	768	7,047	589	7,636
Daytona Beach (Hasche reformed)	46,000	5,678	—	5,678	6,370	12,048	1,378	13,426
Triangle Gas Co.	12,000	1,350	1,093	2,443	281	2,724	389	3,113
TOTAL—THE HOUSTON CORP.	1,108,700	51,568	44,336	95,904	29,593	125,497	20,984	146,481

country. Distribution operations were mostly unprofitable due to competition from electricity and the stranglehold of fuel oil.

F. E. Stanley's personal investigation of the potential natural gas market in the Peninsular State convinced him that natural gas must be introduced throughout Florida to assure that state adequate opportunity for economic growth to keep pace with such development throughout the nation. And he concluded that attitudes of state and distribution company officials, and the people of the state, represented a favorable climate for the introduction of a better energy source.

In August 1954, Mr. Mack's health was failing and he asked Mr. Stanley to assume the leadership required to bring Houston Texas Gas & Oil's plans to completion. At a board meeting on Dec. 8, 1954, Mr. Mack's suggestion was approved. F. E. Stanley then accepted the chairmanship of the corporation.

Previous to this period, Houston Texas Gas had no firm commitments for gas supply. Several friends of Mr. Mack had indicated interest in selling to HTG&O, but the Phillips Decision had killed this interest before it materialized into contracted arrangements. So, Stanley and his associates started a perusal of the gas patch for gas supply.

A company, Coastal Transmission Corp., wholly owned subsidiary of Delhi-Taylor Oil Corp., was already in existence when the Houston Gas group started looking for an alternate gas supply. Coastal planned to construct and operate a gas gathering system deep in the heart of the Gulf Coast regions of Texas and Louisiana. This system planned to sell gas to several long-line gas transmission systems.

John O. Sue, a retired Humble Oil & Refining executive, was then president of Coastal Transmission. Houston Texas Gas & Oil felt it had a market, but knew it had no gas supply. Coastal was having trouble with gas supply because of the Phillips Decision, but was further along than HTG&O. However, Coastal's pipeline company customers were not turning up in droves. Essentially, however, HTG&O was looking for gas supply at about the same time Coastal was looking for market.

As mentioned, Coastal was an offshoot of Delhi-Taylor Oil Corp., one of the prime holdings of many directed by Clint Murchison—a name not unfamiliar to those in oil and those following natural gas pipeline projects. One of its vice presidents was young, able W. J. "Jack" Bowen who left the Corps of Engineers for a petroleum engineer's job with Delhi-Taylor in 1949. He had been a vice president of Coastal since its inception. The presidency became his during August of '56.

After each of these companies had taken a close look at the possibilities of the other, and after some pawing and shifting, the two groups got together on a proposition.

Houston Texas Gas filed for its project in August 1955, and Coastal sailed in to FPC during February 1956. As is the usual experience with such dynamic projects, there were some "intrigue, opposition and close calls."

It was so close in Federal Power Commission that the FPC staff recommended that both Houston and Coastal be denied certificates. The full commission squeaked the projects through by a 3 to 2 vote and after attaching numerous conditions.

Of great interest to FPC and the gas industry in general were user-producer contracts between: (1) Florida Power Corp., and Pure Oil Co. and Sun Oil Co. and (2) Florida Power & Light Co. and Sun Oil, Magnolia Petroleum Co. and La Gloria Oil & Gas Co.

Under these agreements the electric power companies purchase the gas direct from producers in the fields. Florida Power will pay Houston Texas Gas & Oil 13.5 cents per Mcf and Florida Power & Light pays 17.5 cents per Mcf as a transportation charge for moving the gas from producing areas to their electric generating plants in Florida. Houston Texas Gas & Oil, in turn, will pay Coastal to move the gas through its system on a cost-of-service basis. The

volumes of transportation gas to be moved are:

For Florida Power
45 MMcf/day, min. 50 MMcf/day, avg.

For Florida Power & Light
90 MMcf/day, min. 100 MMcf/day, avg.

This transportation gas coupled with the concept of selling the industrial demand on a straight commodity rate are the keys to the whole project. A long-distance, large-diameter natural gas project to peninsular Florida would not have been feasible to date without these factors. After the electric power companies were signed up for transportation gas, the project started a more normal "falling together" phase.

The certificates were granted on Dec. 28, 1956. This was shaving things pretty fine because gas producer contracts were pegged on receipt of certificates to construct the projects by not later than Jan. 1, 1957. Had the FPC approvals not been forthcoming prior to Jan. 1, the gas producers could have cancelled their gas purchase contracts with Coastal and gas supply would have had to be renegotiated.

Following approval of the project by FPC, both Coastal and Houston moved to comply with substantial conditions placed on the certificates. When these conditions were met, Federal Power Commission gave the plans their unanimous blessing in March '57. About 30 days after the certificates were granted, the whole project ran into incipient trouble. The Florida Economic Advisory Council, a group of fuel oil and LPG dealers who did not welcome competition invading their monopolistic control of non-gasoline energy supply to most of Florida, filed an appeal with the Circuit Court for the District of Columbia for review of the Coastal-Houston case. In actuality what they did was thank the population of their business area by delaying the arrival of beneficial natural gas, and similarly delaying Florida's economic progress for over a full year. For, the projects could not be financed while court-room cankers ran their course up through the Supreme Court of the United States.

After the certificates weathered these tests, officials were able to visit the halls of Wall Street and obtain funds necessary to build the pipelines.

Two other important milestones were reached when Coastal Transmission became part of The Houston Corp. and when a check for $52,246,425 was handed to Houston Corp. as payment for initial public financing. The first of these events was accomplished in

TABLE 2. UTILITY GAS DISTRIBUTORS WITH NATURAL GAS ALLOCATION

(FPC Docket G-9262—Opinion No. 301)—(Tabulation shows population of their gas service areas, the number of customers now served utility gas and the estimated total number of residential, commercial, and industrial customers to be served in each of the first three years of natural gas operation)

City or utility gas company	*Estimated population gas service area—1959*	*Now served utility gas*	*CUSTOMERS*					
			First year of natural gas operation		*Second year of natural gas operation*		*Third year of natural gas operation*	
			New	*Total*	*New*	*Total*	*New*	*Total*
Central Florida Gas Corp. (mfd.) (Winter Haven, Eagle Lake, Bartow, Lake Wales, Mountain Lake, Dundee, Haines City, Lake Hamilton. Also serves LPG beyond mains to 1300 customers)	58,000	3,000	6,299	9,299	1,137	10,436	1,173	11,609
Clearwater Municipal Gas Dept. (mfd.) (Clearwater, Belleair, Dunedin and Safety Harbor)	48,400	5,773	4,999	10,772	1,350	12,122	1,617	13,739
Florida Home Gas Co. (propane-air) (De Land and Orange City)	18,100	1,611	113	1,724	344	2,068	206	2,274
Sanford Gas Co. (propane-air) (Sanford)	19,000	1,239	—	1,239	246	1,485	148	1,633
Florida Public Utilities Co. (mfd.) (Lake Worth, Palm Beach and West Palm Beach)	103,900	13,047	6,534	19,581	5,680	25,261	4,740	30,001
Gainesville Gas Co. (mfd.)	49,000	3,300	696	3,996	313	4,309	312	4,621
Ocala Gas Co. (butane-propane-air) (Ocala)	22,700	1,878	2,364	4,242	442	4,684	645	5,329
Peoples Gas System (mfd.) (Peoples Water & Gas Div.) (Fort Lauderdale, Dania, Hollywood, Hallandale, Miami Beach, North Miami Beach, Surfside, etc.)	245,000	48,890	3,875	52,765	3,855	56,620	4,355	60,975
Plant City Municipal Gas Plant (butane-air)	13,600	683	696	1,379	193	1,572	236	1,808
Putnam Gas & Fuel Co. (Palatka; to serve E. Palatka)	16,700	1,900	310	2,210	589	2,799	663	3,462
City of St. Petersburg (municipal—mfd.)	195,500	19,070	17,034	36,104	3,290	39,394	4,354	43,748
Southern Gas & Electric Corp. (propane-air) (Bradenton, Sarasota)	58,600	6,100	5,045	11,145	2,271	13,416	1,926	15,342
Peoples Gas System (mfd.) (Tampa Gas Div.)	137,000	20,147	1,054	21,201	1,101	22,302	1,101	23,403
TOTAL EXISTING UTILITY GAS SYSTEMS (Exclusive of those to be acquired by The Houston Corp.)	985,000	126,638	49,019	175,657	20,811	196,468	21,476	217,944

TABLE 3. CITIES WITHOUT UTILITY GAS SERVICE BUT HAVE NATURAL GAS ALLOCATION

(FPC Docket G-9262—Opinion No. 301)

(Population of their gas service areas, number of customers now served utility gas and estimated total number of residential, commercial and industrial customers to be served in each of the first three years of natural gas operation)

City	Estimated population gas service area—1959	Now served utility gas	CUSTOMERS					
			First year of natural gas operation		Second year of natural gas operation		Third year of natural gas operation	
			New	Total	New	Total	New	Total
Avon Park	6,300	—	833	833	109	942	110	1,052
Blountstown	2,500	—	332	332	35	369	37	404
Chattahoochee	9,300	—	368	368	112	480	116	596
Chipley	3,300	—	473	473	70	543	134	677
Graceville	1,800	—	274	274	83	357	84	441
Green Cove Springs	6,200	—	821	821	90	911	98	1,009
Fort Pierce	23,800	—	3,101	3,101	525	3,626	514	4,140
Lake Alfred	2,400	—	323	323	58	381	92	473
Lake City	12,500	—	1,407	1,407	298	1,705	540	2,245
Leesburg	10,200	—	1,193	1,193	163	1,356	269	1,625
Live Oak	6,800	—	567	567	181	748	185	933
Madison	4,000	—	543	543	65	608	93	701
Marianna	6,400	—	811	811	245	1,056	255	1,311
Panama City	47,300	—	5,882	5,882	740	6,622	897	7,519
Perry	3,100	—	677	677	209	886	211	1,097
Starke	4,000	—	680	680	115	795	189	984
TOTAL—Cities without utility gas service	149,900	—	18,285	18,285	3,098	21,383	3,824	25,207

June 1958 when Delhi-Taylor (Coastal's parent company) exchanged its ownership of Coastal Transmission Corp. for stock in The Houston Corp. This move put the entire pipeline and project under the same company ownership. The second event occurred Aug. 29, 1958. In addition, the Houston Corp. owns and will operate distribution properties in Florida.

Though both Houston and Coastal are commonly owned by The Houston Corp. both companies are operated as separate companies. This is because each has its own FPC certificate and have been bonded, etc., separately. Certain key personnel perform the same functions for both transmission companies.

- **Market**

All of the officials of The Houston Corp. and its family of companies with whom we talked quickly inject you with their enthusiasm for Florida as a natural gas market, and as a place to work and dwell. They are particularly proud of the progress their natural gas system will contribute to the life and future growth of the state.

The industrial growth *potential* looks particularly good. At the present time there is nearly limitless land for industrial sites. The labor supply is good and growing all the time. And water supply is excellent. Dependable, flexible, economic energy from natural gas will round out the picture.

Shipping costs are relatively high in moving products from Florida to other market areas, but so are these costs high when moving bulk materials or products into Florida from other manufacturing areas. Thus, Florida itself is a fine market for many products that can readily be manufactured there.

Any industry that needs precise, convenient thermal control in its production process can for the first time have it in peninsular Florida after natural gas arrives. Industries that can use soft flames directly in production will be similarly served. All of this says nothing for the economies in industry that can be realized from natural gas as opposed to other energy sources available in Florida. In short, natural gas may open the door to many industries by supplying energy in a form that has been needed throughout the state for a long time.

Raw materials and the other factors we have discussed are in Florida for such industries as lime production (for construction materials, paper mills, agriculture, refractory, water purification, general chemicals, etc.), ceramic ware, brick, and glass. The chemical industry holds a lot of promise for growth in the state. Natural gas can furnish both raw material and energy for it. And natural gas can keep such plants clean from an air pollution point of view which is important in a tourism state.

Let's take a close look at what natural gas can mean to Florida—the stakes in the game if you will. I traveled the length and breadth of the state in January, and here is the way the whole thing looks to this non-expert.

Florida has been on the boom since the end of World War II. This has been particularly true as far

as land sales and new housings are concerned. Some new industry has moved in too. In fact, quite a lot of industry by comparison with the industrialization of Florida before World War II.

However, by direct comparison of the industrialization of Florida with other prosperous states that are growing, it is easy to see that industry really hasn't come to Florida yet. The main industry is still tourism.

From the air one sees many thousands of new homes waiting to be sold. One sees still more areas laid out with streets and lots just waiting for someone to build on them. Who will buy these homes? Will it be retired or otherwise unemployed people who are just looking for the sunshine? Or will it be wage earners?

If Florida is ever going to get a better balanced economy, it will need an influx of wage earners. But this type of in-migration must be based on new industry and new jobs. Florida developers will have a hard time selling the estimated 40,000 new dwelling units per year for the next 12 years without new industry to produce a whole lot of completely new places for people to work.

It is my opinion that this Houston Corp. natural gas system is the weight that just might swing the balance to the side of continued, prosperous, high-level growth for Florida. Industry is needed and industry needs energy—the two are partners in any area's progress. Natural gas at a reasonable price for home, commerce and industry may be the stimulus to Florida's industrial development. Industry may come to Florida. If it does, the people can thank the planners, builders, and operators of Coastal Transmission, Houston Texas Gas & Oil, and The Houston Corp.

• Distribution

As previously mentioned, there were some 18 gas distribution companies worthy of the name in Florida before The Houston Corp.'s natural gas project really started rolling. Without exception they were in pretty poor shape. This is not a reflection on the many fine gasmen who worked for and operated these systems. The gas companies were merely stymied by the high cost of manufactured gas and LPG in relation with electricity, fuel oil and kerosene.

Some gas systems were controlled by combination (electric power and gas) companies that had little interest in expanding the piping systems or adding additional gas production capacity. Others didn't have either the gas supply or public acceptance of gas service that merited any but necessary, minor expansion of the physical piping system. And the potential market was nothing to shout about. Generally speaking gas companies and gas service were simply poor stepchildren in Florida over the past 20 years.

The best tribute that one can give to gasmen beleaguered by such an operating climate is to point out that in spite of the obstacles, the piped-gas systems were more than holding their own for the cooking load in peninsular Florida. Readers will understand that it is difficult for a company and its employees to be aggressive when they have a high-priced product with only limited, if any, additional capacity to sell.

All this has changed with the start of construction of the Texas-to-Florida pipeline. The gas distribution business in Florida has been reborn. Before June 1 of this year these existing distribution systems and some new ones, too, will have natural gas available in volumes to meet any and all demands that develop. They will have a fuel with which they can do so much more than with their previous gas. They will also have a product that will do so much more than any other fuel, for so much less. And they will have the active support, progressive leadership, and aggressive resources of The Houston Corp. and its two pipeline subsidiaries to spark the growth of the new life. A new era has been opened to gas distribution operations in Florida just as a new era of economic possibility has been opened to all of Florida.

Since Aug. 25, 1958, The Houston Corp. has acquired the following Florida gas distribution properties:

TABLE 4. ESTIMATED NUMBER OF CUSTOMERS DURING FIRST THREE YEARS OF OPERATION

SUMMARY

	Estimated population gas service area—1959	*CUSTOMERS*					
		Now served utility gas	*First year of natural gas operation*		*Second year of natural gas operation*		*Third year of natural gas operation*	
			New	*Total*	*New*	*Total*	*New*	*Total*
I. Existing utility gas systems:								
(a) To be acquired by The Houston Corp. Daytona Beach not to be supplied with natural gas under initial construction program	1,108,700	51,568	44,336	95,904	29,593	125,497	20,984	146,481
	46,000	5,678	—	5,678	6,370	12,048	1,378	13,426
Exclusive of Daytona Beach	1,062,700	45,890	44,336	90,226	23,223	113,449	19,606	133,055
(b) Other existing utility gas systems	985,000	126,638	49,019	175,657	20,811	196,468	21,476	217,944
SUB-TOTAL	2,047,700	172,528	93,355	265,883	44,034	309,917	41,082	350,999
II. Cities without utility gas service	149,900	—	18,285	18,285	3,098	21,383	3,824	25,207
TOTAL	2,197,600	172,528	111,640	284,168	47,132	331,300	44,906	376,206

JACKSONVILLE GAS CORP.—This utility was acquired by Houston Corp. through the latter's purchase of all of the former's outstanding stock. It will be operated as a subsidiary company. Jacksonville Gas served that city and environs with manufactured (water) gas. It has some 4000 straight LPG customers beyond its mains (see *Table 1*).

SOUTH ATLANTIC GAS CO.—Houston Corp. purchased the water gas distribution properties of this company in Orlando and Winter Park. It also had LPG customers in its general service area but beyond any of its main extensions (see *Table 1*).

FLORIDA POWER & LIGHT PROPERTIES—The gas division of this company served Miami (but not Miami Beach), Coral Gables, South Miami, and West Miami with manufactured water-gas. Hasche reformed gas was used to serve Lakeland and Daytona Beach. The Houston Corp. has purchased all of these properties. Current plans call for converting all of these systems (except that at Daytona Beach) to natural gas this summer. Daytona Beach will stay on its Hasche set this winter with the unit being moved from Lakeland to Daytona Beach for peak and stand-by service (see *Table 1*).

TRIANGLE GAS CO.—Houston Corp. has purchased this company's butane-air systems that serve Eustis, Mt. Dora and Umatilla. They will be converted to natural gas as the wonder fuel becomes available (see *Table 1*).

It is not unlikely that other distribution operations may have been acquired by The Houston Corp. as this issue goes to press. In any case, there is no question about additional existing distribution properties being acquired and new distribution systems being built by The Houston Corp.

The gas distribution picture does not end with The Houston Corp. properties. *Table 2* shows existing gas distribution systems not owned by The Houston Corp. that have received an allocation of natural gas. This table also gives data reflecting the current state of the gas companies and the progress it is estimated that they will make during the first three years of natural gas service.

Table 3 has been prepared to show cities in Florida without utility gas service but for which an allocation of natural gas has been made. These cities will have new natural gas systems developed to serve them. Most, if not all, will be municipal systems.

The data on *Table 4* reveal the over-all distribution picture through the first three years of natural gas service for all utility gas systems that will purchase natural gas for resale.

Looking a moment at the domestic market it is soon seen that it is a bit odd. There is little heating load to speak of on the existing distribution systems. Of course, the climate is mild during most of the winter months and some dwellings and commercial establishments are not equipped with space heating facilities. However, fuel oil dominates the space heating field where heating units are installed. A look at DDD averages is interesting:

Jacksonville (Airport)	1243 DDD/yr. avg.
Jacksonville (Civic Center)	1113 DDD/yr. avg.
Miami (Airport)	178 DDD/yr. avg.
Miami (Civic Center)	173 DDD/yr. avg.
Tampa (Airport)	674 DDD/yr. avg.

This gives a pretty good picture of the situation since Jacksonville is in the northern part of the peninsula, Tampa is about central, and Miami is in the southern segment. Jacksonville's heating climate is somewhat similar to Los Angeles which averages 1451 DDD/yr. But, Miami is particularly warm.

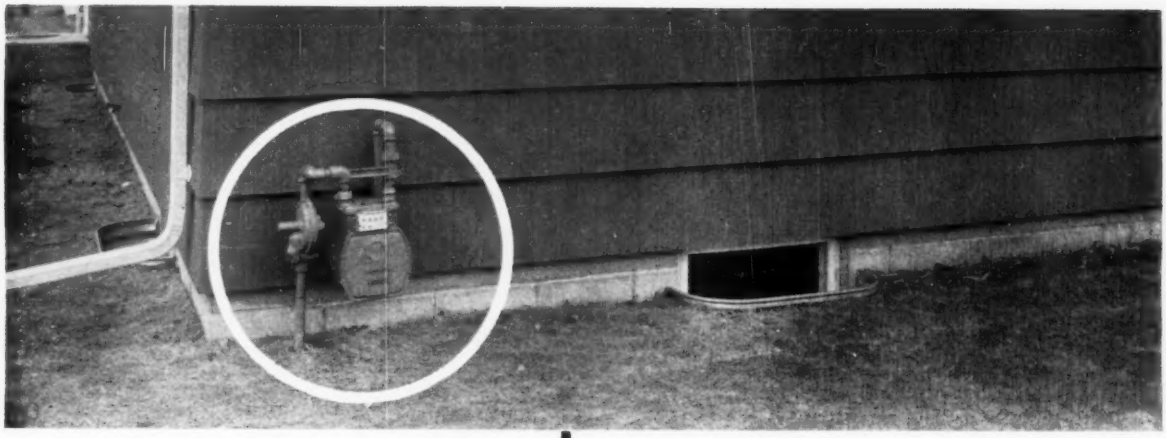
Actually, the air that warms Florida in winter is Canadian—which is something of a paradox. It sweeps across the U. S. and out to sea from the Atlantic coastline. Characteristically, the air then makes a big "U" turn and drifts back to land over Florida. The catch is that the warm Gulf Stream is crossed as the air leaves the Atlantic seaboard and again as the air flow heads inland to Florida. The warming from the Gulf Stream does the trick. When it does get really cold in Florida—and it actually does on occasion—it is due to a mass of air from Canada failing to take the bend to sea and, instead, heading directly for the land of winter sunshine. On these fairly rare occasions, space heating is definitely needed. These "cold snaps" can be aggravating to gas distributors' peak load problems.

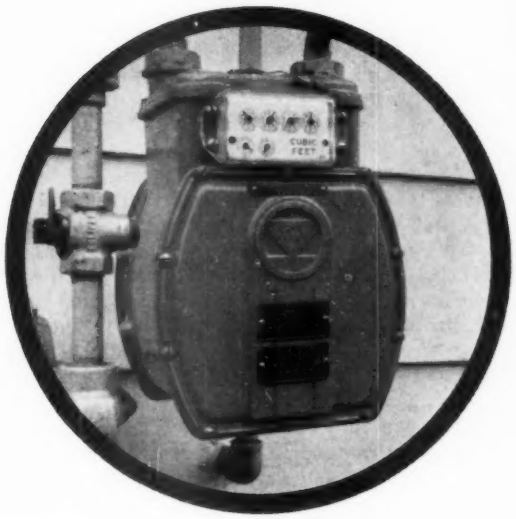
There seems to be great promise for summer air conditioning in the state. It is conceivable that the gas-cooling load could exceed the space heating demand after a few years of natural gas development in Florida. Design temperature average about 95 degrees F dry-bulb and 78 degrees F wet-bulb over most of the peninsula. Humidity ranges from relatively high in the winter to generally sticky all summer. With improved gas-fired summer-winter air conditioning equipment on the market and more coming, the potential for this load in the natural-gas served area is high.

The Houston Corp. distribution systems will merchandise and aggressively promote gas appliances. They have plans to cooperate to the fullest extent with LPG dealers.

It won't be long now before nine-man conversion crews will be a familiar sight as they work section after section in existing distribution systems converting gas appliances for a new era—the era of clean, dependable, flexible, economic natural gas. ■

For the story of how the pipeline to sunshine was built, turn to the Pipeline Section (page 107)





Want to move those meters outdoors?

Temperature compensating meters may be the answer

By J. FRED EBDON, Editor

NORTH of Chicago near Bellwood the wind was whipping across the Illinois plains one day during the current winter. Snow flurries shunted about under a lead-grey low ceiling as if they too were cold and would like to join their kind in a "warm" drift. It was just after daybreak. The temperature had nudged 20 degrees below zero.

Driving through a still-drowzy new housing development, an experienced gasman would have been shocked to see domestic gas meters nestled against walls of these houses. He would have taken a second look to make sure that these gas meters were indeed installed outdoors.

On the same morning, up in Minneapolis, had this gasman been able to project himself, he would have found that the weather was even more undelightful temperature-wise. Jack Frost had driven his icy touch to nearly 30 below, even if he had failed to produce snow in amounts to please winter sports lovers of the area.

But, had our operating gasman toured a certain community just outside Minneapolis' city limits his chattering teeth would have abruptly quit their melody as he beheld gas meters serenely measuring away outdoors, unmindful of the depressed temperature.

In both cases, the meters appeared to be standard models. Even on close inspection the only deviation

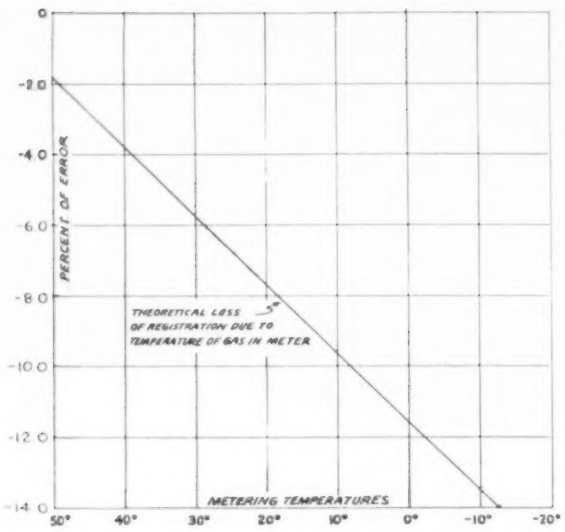


Fig. 1. Curve shows theoretical loss in registration for a typical leather diaphragmed meter as metering temperature is reduced.

from normal appearance was a bright red additional badge that indicated the meters were mindful of the temperature—it proclaims these meters were temperature compensated models. These domestic gas meters were designed for cold-climate outdoor installation. Their indexes indicated the volume of gas they passed at the base temperature of 60 degrees F when ambient temperatures ranged from —30 degrees to +150 degrees F, or any temperature there-between.

It was and is the standard practice of cold-country gas distributors to install billing meters indoors. This is, of course, a hangover from the straight manufactured gas days. With condensate-laden manufactured gas, the only way to avoid freeze-ups of metering and pressure regulating equipment at low temperature was to install such equipment where it would operate at relatively normal temperatures, i. e., indoors. There are other reasons for indoor metering too.

First, it is a known fact that leather diaphragmed meters prove progressively fast as temperature drops, but this compensation is not as great in these leather diaphragmed meters as the necessary correction to compensate for volume changes as specified in Charles' Law (see *Fig. 1*). However, this was not as prime a reason for not installing conventional meters (with leather diaphragms) outdoors as was the fact that research revealed pilot loads could not be passed under some conditions of extreme temperature.

Cold box experiments with leather diaphragmed, hardcase meters were set up. Gas was supplied to the meter at 6-in. wc pressure with a pilot burner as the only load. The meter was cooled to —35 degrees F. Meters could not pass enough gas to maintain the pilot flame. Yet, it was learned that by application of a 100-cu ft per hr load and increasing the differential across the meter above 6-in. wc, the meter would start up again with a quick drop in differential to about 4-in. wc.

Other testing showed that at 0 degrees F, the meter differential under just pilot load was 0.17-in. wc. But when a 100-cu ft per hr load was suddenly applied, the pilot was extinguished by the sudden pressure drop. Pressure quickly returned and the test meters tend to deliver the 100 cu ft per hr with a differential of about 2.0-in. wc across the meter.

Meters diaphragmed with low temperature synthetic material delivered the pilot load at —30 degrees with a differential of 0.13-in. wc. Under sudden application of a 100-cu ft per hr load, the differential merely increased to 0.61-in. wc without extinguishing the pilot burner.

Thus, it is obvious that the possibility of losing pilot burners and subsequent return of gas passage to present a safety hazard, influenced gas distributing companies in cold climates to stay with indoor metering, as did the reduction of accuracy with outside meter installations at low ambient temperatures.

Between northeastern and southwestern gas companies, there is what might be considered a "twilight zone" of gas operations. Companies in this in-between area look longingly to the Southwest and some of their obviously advantageous gas operations procedures. Gas companies in the Chicago, St. Louis, Milwaukee, and Minneapolis area have very wisely taken a step-by-step approach to modulating from their manufactured gas operations techniques to some of the standard practices of the Southwest. The fact that many southern, southwestern and western gas companies can demonstrate years of successful experience with nearly 100 per cent of their billing meters installed outdoors has always intrigued gasmen in the twilight zone.

The reasons for the interest in metering outdoors rather than indoors are many. Here are some of the advantages of outside meter installations:

- 1. Better customer relations.
    a. Outside meter installations reduce the inconvenience and annoyance indoor meters cause customers.

Master meter installed in a new housing development where a group of temperature compensating domestic meters are being field tested.

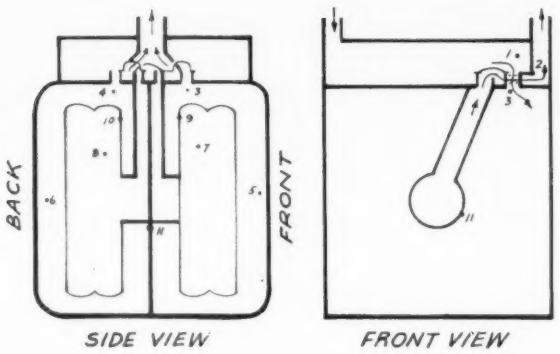


Fig. 2. Test to find location of average metering temperature. Location of test points in metric IC meter:

1. Inlet chamber near valve.
2. Imbedded in metal between inlet and outlet.
3. In gas stream entering and leaving outer front chamber.
4. In gas stream entering and leaving outer back chamber.
5. In center of outer front chamber.
6. In center of outer back chamber.
7. Inside inner front diaphragm chamber.
8. Inside inner back diaphragm chamber.
9. In contact with front fixed diaphragm plate.
10. In contact with back fixed diaphragm plate.
11. Imbedded in metal between front and back chamber and between the inner and outer chamber.

	TEMPERATURES (deg. F)										
Amb.	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
— 7.0	— 5.5	— 3.0	— 5.0	— 5.0	— 5.0	— 6.0	— 6.0	— 5.0	— 5.5	— 5.0	— 5.0
—23.5	—21.0	—18.5	—20.5	—21.0	—21.0	—22.5	—22.0	—21.0	—20.5	—21.0	—21.0
26.4	27.8	27.8	27.8	27.8	27.8	27.8	27.8	27.8	27.8	27.8	27.8

b. Customer does not have to provide space in the home for a gas meter.
c. Elimination of call back on account of inability to get in to read the meter.
d. No special meter cabinets or glass blocks required.
e. Gas company employees do not have to work on (and damage) outside or basement walls.
f. No basement wall sealing problems or basement leakage and damage to contend with.
g. Fewer storm doors damaged.
h. A measurable reduction in dog bites and other engagements with "pets."

- 2. Reduction in service line costs to gas companies.
- 3. Meter changes can be accomplished without gaining entry to homes.
- 4. Permits easy turn-offs for nonpayment.
- 5. Lower meter reading costs.
- 6. Eliminates estimated bills and resulting factors.
- 7. No delayed revenues due to "no-reads" which cannot be estimated.
- 8. Area turn-offs can be made more quickly and surely, with fewer people, during an emergency.
- 9. Significant decrease in probabilities of shorts in cathodically protected systems.
- 10. Permits prefabrication of meter and regulator assemblies.

These are just 10 good reasons why outside gas measurement is advantageous if it can be done accurately There are many, many others, with those along safety and public liability lines being particularly obvious.

With these advantages in mind, many companies in cold climates were looking about 10 or more years ago for meters that could be installed outside or for ways of reading meters installed inside from outdoors. It is interesting to note that the Sangamo and other remote index-reading devices were a result of this quest.

Some gas companies, however, felt that the ultimate answer was a meter that could be installed outside, yet would function normally at extreme temperatures and would produce measurement at a base temperature regardless of the variance in ambient temperatures.

Several gas companies and all of the meter manufacturers were interested in the development of such a meter. However, some basic research had to be done to answer some unknowns first.

• Performance of meters at low temperatures

Actual metering temperature has long been a subject of discussion among measurement men. Some claimed metering temperature is close to flowing gas temperature entering the meter. And most proponents of this theory asserted that flowing temperature does not vary much in relation to extremes of ambient temperatures. Others refuted this approach.

One of the leaders in this type of research was Northern Illinois Gas Co. (Bellwood). Over a decade ago, L. L. Gilliland, R. J. Dufour and D. V. Meiller, working in that company's testing department, observed that gas temperature at a meter's outlet always approached ambient temperature (with a reasonably steady ambient temperature) regardless of the temperature at which gas entered the meter. This can be shown to be true by calculation as the specific heat of gas is so low that total heat that must be lost or gained to approach ambient is small compared to possible heat transfer into or out of a meter body.

Very careful cold-box tests (See *Appendix 1*) made to laboratory exactness by Northern Illinois' testing department confirmed this metering fact: *The metering temperature and the ambient temperature are, for practical purposes, identical (see Fig. 2).*

Another problem to explore was the theoretical metering error plotted with progressively lowered temperatures. Again, the cold box at Northern Illinois Gas Co.'s testing department revealed some interesting data for standard meters without temperature compensation as well as for compensated meters. Analysis of the complete data revealed that

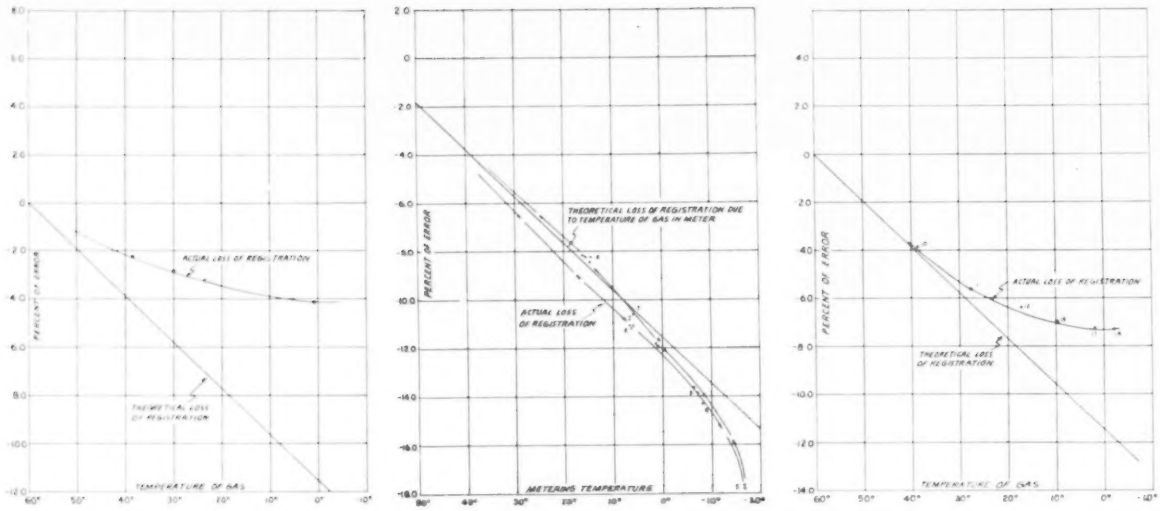

PERCENT OF ERROR
ACTUAL LOSS OF REGISTRATION
THEORETICAL LOSS OF REGISTRATION
TEMPERATURE OF GAS
PERCENT OF ERROR
THEORETICAL LOSS OF REGISTRATION DUE TO TEMPERATURE OF GAS IN METER
ACTUAL LOSS OF REGISTRATION
METERING TEMPERATURE
PERCENT OF ERROR
ACTUAL LOSS OF REGISTRATION
THEORETICAL LOSS OF REGISTRATION
TEMPERATURE OF GAS

Fig. 3. Typical curves showing theoretical vs. actual loss of registration at very low temperatures for a hardcase meter with standard leather diaphragms (left), and (center and right) hardcase meters with synthetic diaphragms.

leather diaphragms of all types have an inherent compensating effect due to the stiffening of the leather at low temperatures. These compensating effects vary between types of diaphragms but are apparently affected more by the dressing used in the diaphragms than by the type of diaphragm itself.

Synthetic diaphragms follow the theoretical loss plot linearly to a certain point, then deviate, and performance with synthetics showed some hysteresis on being chilled and warmed again. The average loss of registration for meters with synthetic diaphragms at zero degrees F was 12.2 per cent as opposed to a theoretical effect of 11.5 per cent. It is reasonable to assume that the theoretical loss of registration for such meters mounted outdoors without compensation will be about the same at the same temperature.

Some typical curves from this research are shown on *Fig. 3*.

• Economics of outdoor metering

One of the most interesting attractions of outdoor metering is the reduction of investment per new customer. It is estimated that a meter and service can be installed outside at a saving of between $10 and $15 under an inside installation. On the meter set, the time of installation can be reduced by about one manhour from the present average for an indoor set which takes about two and one-half manhours.

On the installation of the service line, costs can be reduced by approximately one and one-half manhours from the present 12 to 15 manhours.

Too, annual operating costs can be reduced in the areas of meter reading, MIR costs, high bill complaints, etc., when outdoor metering is used.

In the actual billing operation, it is obvious that revenue would be lost if outdoor metering with no temperature or billing compensation was done in colder climates. This has been established by gas company tests and by meter manufacturers' tests. Such testing has been done in the Chicago, New York, south Jersey, Philadelphia, central New York state, Michigan and North Carolina areas, among others. These data show conclusively that there will be a loss of between 2 and 8 per cent in volume metered by an uncompensated meter set outdoors as compared with that of a similar meter installed indoors.

Perhaps data obtained from Northern Illinois Gas Co. for its particular rates, loads and other conditions will serve as a typical example (see *Table 1*). Their data are based on a new six-room home with 55,000 Btu heat loss and no summer air conditioning.

For Northern Illinois' conditions, outdoor metering from the table would result in an $8.11 annual revenue reduction or 4.8 per cent.

• The temperature compensated meter

The meter manufacturers have long been aware of the desires of many cold-climate gas distributors to move metering outdoors. Many patents for adding the temperature compensating feature to gas meters have been issued. Until recently, however, the methods and meters did not meet the standards at which the gas companies wish to operate.

TABLE I

Type of gas use	*Indoor metering*	*Outdoor metering with no temperature or billing compensation*
Annual domestic use:		
Therms as metered	450	441
Reduction		9 (2.0%)
Annual space heating use:		
Therms as metered	1461	1378
Reduction		83 (5.7%)
Total use:		
Therms as metered	1911	1819
Reduction		92 (4.8%)

The American Meter Co. is one of the manufacturers that was very sympathetic with the concept of a temperature compensated meter. Its research and development team has produced a meter that seems to be the answer for those gas companies wanting outdoor metering with the index indicating volume passed at a base temperature regardless of the ambient temperatures.

American's "new" temperature compensated meters of various types are specifically built for the cold weather. More than 2000 are out on test in the properties of several Northwest and Midwest gas companies.

The temperature compensating feature is accomplished by a temperature compensating tangent which is used in place of the standard adjustable tangent (see *Fig. 4*).

With attention on the temperature compensating tangent, notice that there is a stamping (F) which is soldered to the crank and carries the check rate adjusting screws. Part (G) pivots on (F) and carries the stroke adjustment. Lock nuts permit setting and locking the stroke adjustment. Two bimetallic strips are locked to the stroke adjustment and carry the tangent wrist. The two strips make a member with rigidity equal to that of a conventional tangent and equally resistant to proof changes from fouled valves.

The active elements of the temperature compensating tangent are the two bimetallic strips. They are designed and proportioned to move the tangent wrist away from the crank with increasing temperature and toward the crank with decreasing temperature. As the tangent wrist moves away from the crank, the diaphragm stroke is increased and the meter passes a larger volume of gas per revolution of the crank, or vice versa.

Since leather diaphragms tend toward some compensation and then to fastness as temperature drops, American Meter had equipped its temperature compensating models with linear synthetic diaphragms. The D-7 Duramic diaphragms will give a constant proof down to —20 degrees F and lower. Also, the stuffing boxes have been redesigned to produce a rubberlike grommet seal that completely isolates the gallery.

We visited both Northern Illinois Gas Co. and Minneapolis Gas Co. to get some early indications of their operating experience with test programs on American 5B/225 temperature compensated meters.

• Operating experiences

Minneapolis Gas Co. received a small shipment of experimental American temperature compensating meters two years ago. Its initial testing consisted of installing compensated and standard uncompensated meters in series, both outdoors and indoors. In other words, at the homes of employees, for example, Minneapolis would set a compensated meter outside, and a standard uncompensated meter outside, then an uncompensated meter inside (the billing meter) and, in most cases, a compensated meter inside. These would all meter the same gas in series, of course.

It was learned that the temperature compensated units, both indoors and outside, did not vary from the indoor billing meter (uncompensated) by more than 0.5 per cent. The company felt that it couldn't adjust meters to proof any closer than that under production line, routine conditions.

Minneapolis Gas ordered 300 temperature compensated meters from American last summer. Some 200 were installed in the suburbs outside the Minneapolis city limits in time to get a full winter of experience. Other temperature compensated meter installations have been made during the winter as needed.

The installations were confined to a specific area. Gas to that area is measured through a master meter so that the aggregate volume measured by the hundreds of temperature compensating meters can be

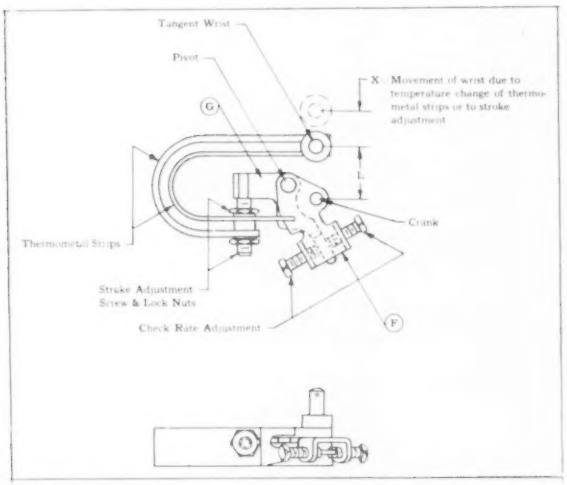
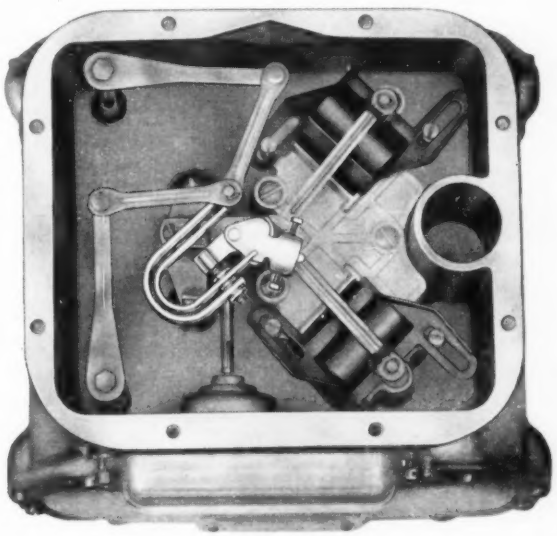


Fig. 4. Temperature compensating tangent as drawn and as installed in an American meter.



compared with the Roots-Connersville rotary master meter's corrected volume at the end of the heating season.

The company has had no complaints this winter from customers who are metered with the American temperature compensating models. Nor has it observed any failures to register. In fact, it is getting an average of about three calls per day from customers who would like to have their meters moved outdoors.

Minneapolis feels that initially the temperature compensating meters will necessitate some additional education in proving in the meter shop, after which there should be no difference in repair work.

Minneapolis plans to install an additional 6000 to 7000 of these temperature compensated meters this year.

Northern Illinois Gas Co. (Bellwood) approached the outdoor metering objective in steps. It started by moving service regulators outdoors first. Then, between 1950 and 1953 it carried out extensive controlled testing of experimental temperature compensating meters in its cold box (see *Appendix 1*). The measurement capability displayed by early temperature compensating meters made by several manufacturers did not show up too well by comparison with the very carefully calibrated critical flow orifice used for master metering in the cold box.

However, when the compensating device now used on the American meters was developed two years ago, it performed well in the cold box.

Therefore, Northern Illinois petitioned Illinois Commerce Commission for permission to initiate a field test program using the American temperature compensating meters. In order No. 45476, the commission gave the gas company permission to start a three-year program to install some 300 new temperature compensating meters on an experimental basis. North Illinois then ordered 300 of the American meters designed for this service.

The 300 temperature compensating meters were installed in two groups, each having a large 250B Ironcase American master meter with a Base Volume Index. These meters have not produced a full-winter's operation as yet.

However, NIG has pulled a group of 20 American Meter temperature compensated units to determine their per cent of accuracy at varying temperatures. First, three uncompensated aluminum American 5B/225 meters were carefully proved at 100 per cent of accuracy at the Northern Illinois meter shop. These meters were then carefully checked at 60 degrees F in the cold box at NIG's laboratory. The flow through a critical flow orifice at 60 degrees F was determined with these meters. Then, the flow through the critical flow orifice at this temperature was used as the standard in testing the per cent of accuracy of the compensated meters.

A series of tests at three temperatures was conducted on each American temperature compensating meter, with two or more tests at each temperature. The temperatures and sequence used in the testing

NORTHERN ILLINOIS GAS COMPANY — OCTOBER 1958

TESTS FOR ACCURACY - TEMPERATURE COMPENSATED METERS

Test Number	Northern Illinois Gas Co. Meter Number	Tested at 60° F		Tested at -2° F		Tested at 90° F	
		Proof	Departure from 100% (% slow)	Proof	Departure from 100% (% slow)	Proof	Departure from 100% (% slow)
1	742560	98.48	1.52	98.06	1.94	99.23	.77
2	742740	98.11	1.89	98.58	1.42	98.31	1.69
3	742800	98.63	1.37	99.55	.45	99.67	.33
4	742680	98.28	1.72	99.11	.89	99.04	.96
5	742590	98.34	1.66	99.05	.95	98.41	1.59
6	742515	98.21	1.79	98.46	1.54	98.34	1.66
7	742650	98.25	1.75	98.67	1.33	98.66	1.34
8	742530	98.57	1.43	98.89	1.11	98.70	1.30
9	742575	99.71	.29	99.69	.31	99.70	.30
10	742635	99.28	.72	100.15	(.15)	99.22	.78
11	742695	98.54	1.46	99.06	.94	98.03	1.97
12	742605	98.68	1.32	99.57	.43	98.60	1.40
13	742620	98.65	1.35	98.38	1.62	99.06	.94
14	742785	98.83	1.17	98.37	1.63	99.11	.89
15	742725	98.96	1.04	99.92	.08	99.25	.75
16	742545	98.55	1.45	98.28	1.72	98.59	1.41
17	742770	98.92	1.08	99.31	.69	98.68	1.32
18	742755	98.82	1.18	98.96	1.04	98.78	1.22
19	742665	98.81	1.19	98.58	1.42	98.82	1.18
20	742710	98.49	1.51	98.18	1.82	98.32	1.68
Average	--	98.66	1.34	98.94	1.06	98.83	1.17

Fig. 5. Tabulated results of Northern Illinois tests.

APPENDIX I

Description of Cold Box at Northern Illinois Testing Laboratory

The ground box consists of a refrigerated tank containing a glycol and water solution. The solution is constantly maintained at 32 degrees F by a refrigeration unit. A copper coil passes gas through this solution. The gas is cooled during this passage to simulate winter ground conditions.

The second refrigerated chamber is a test box where temperatures can be maintained under very accurate control from —20 degrees to +100 degrees F. A complete standard regulator and meter set is installed in this chamber. Pipe and fittings in a standard setting are also installed therein.

Thermocouples are installed to measure temperatures at more than 11 selected points in the ground box and test chamber. Draft gauges and manometers measure differential and pressure. A fan circulates air within the test box.

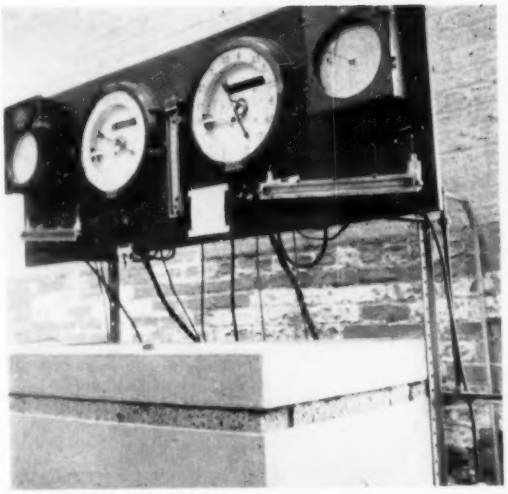
The reference junctions of the thermocouples are immersed in a constant temperature water bath maintained at exactly 60 degrees F by a separate refrigeration unit. A critical flow orifice is also immersed in this bath. The orifice is designed to pass exactly 100 cu ft of gas per hour. To provide assurance of critical flow with a meter operating at normal pressure (6.0-in. wc), a vacuum pump is installed which maintains 25-in. mercury vacuum on the outlet of the critical flow orifice.

When a meter (such as temperature compensating models) is prepared for test, it is sealed and immersed in the constant temperature water bath. Thus, its original proof in respect to the critical flow orifice can be determined while both are at 60 degrees F. A record is kept of the time required for a certain number of revolutions of the proving hand.

The meter under test is then installed in the test chamber. Gas passes through the ground box coil, emerges to pass through the service regulator, passes through the meter, and out into the constant temperature water bath. It then passes through the critical flow orifice, into the vacuum pump, and is discharged.

Tests are made by timing a given number of complete revolutions of the test dial at whatever temperatures have been selected. All readings are corrected to compensate for pressure drops, barometric changes, and changes in specific gravity of the gas being used.

At the end of each series of tests covering a given meter, it is returned to the constant temperature water bath and rechecked at 60 degrees F against the critical flow orifice.



One end of, and some of the instrumentation used with, NIG's cold box. Much research on the operation of gas meters at depressed temperatures has been done by this gas company.

were: (1) 60 degrees F, (2) —2 degrees F, and (3) 90 degrees F. The per cent of accuracy was found by dividing the standard flow by the average flow through the compensated meters. The tabulated results of these tests are shown on *Fig. 5*.

• Conclusion

Experimental field programs with temperature compensating meters indicate that the industry has a temperature compensating meter that promises to solve the problem for those gas companies that currently meter indoors due to widely varying atmospheric temperatures, yet wish to install gas meters outdoors. Early evaluation tends to prove that temperature compensating meters can measure accurately enough to satisfy both gas company and regulatory commission standards. Further, accuracy, stability and ruggedness of the compensator used in the American temperature compensating meter models has been established by the manufacturer in laboratory and field. Gas companies' field testing programs are confirming these results.

Hence, the door may be open to outdoor metering under extreme climatic conditions with gas industry standards of accuracy and dependability, and with immeasurable benefits to the gas industry through the better relations with customers that accrue from outdoor metering. ■

A GUIDE TO TRAINING SERVICEMEN—1

Training supervisor Michael St. Phillip conducts typical classroom session at Citizens Gas & Coke.

Gas ranges and basic electricity

By R. D. MONTGOMERY, Utilization Engineer
Citizens Gas & Coke Utility, Indianapolis

This is the first of a seven-part series on the training of servicemen to service major gas-fired appliances. Future articles will cover training material for central heating, refrigerators, air conditioning, water heaters, dryers, and incinerators.

GAS exclusive

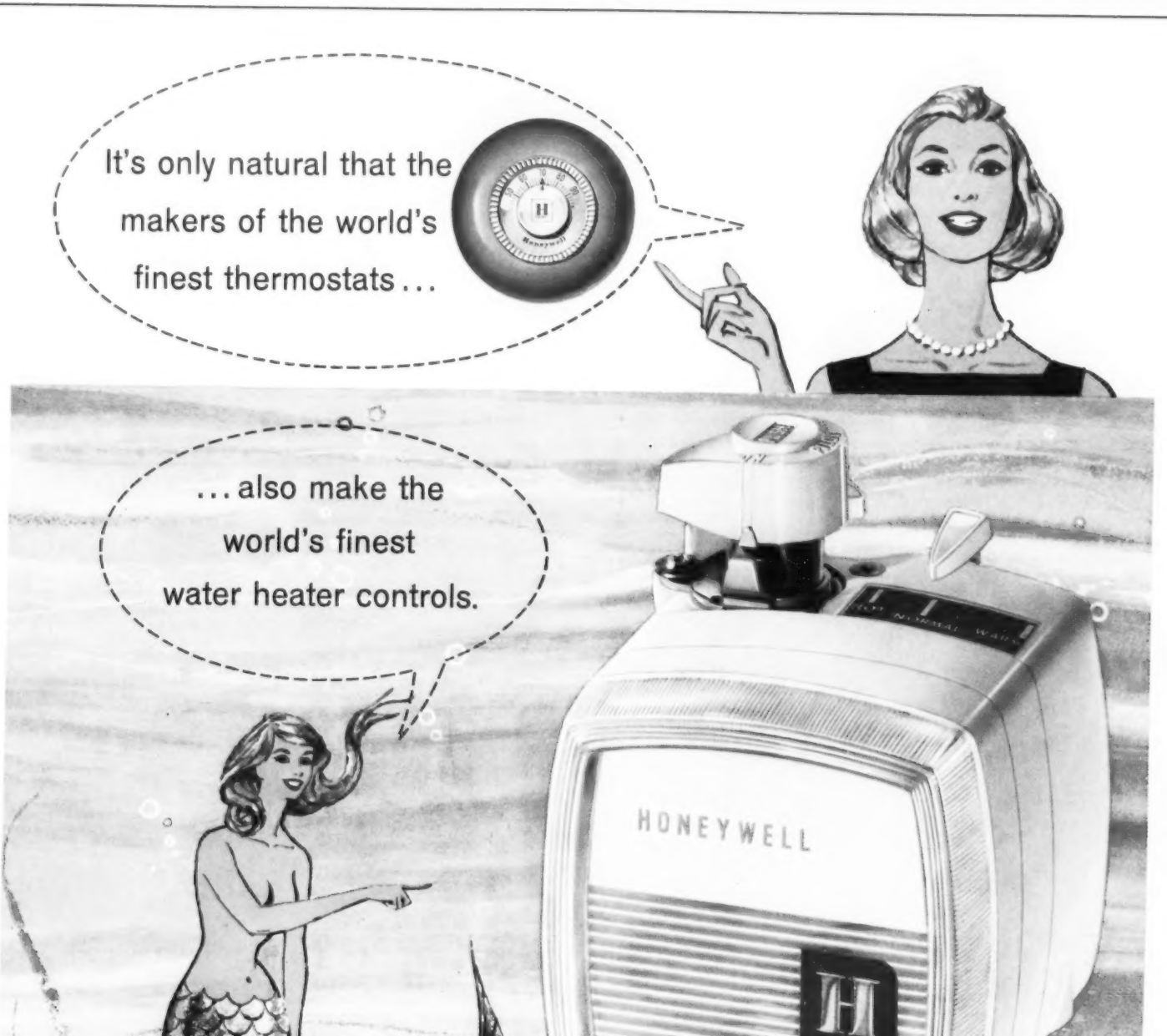
CITIZENS GAS & COKE UTILITY serves over 150,000 customers with a mixed gas having a gross heating value of 800 Btu per cu ft. The utility is divided into four major divisions: general office, production, distribution, and utilization.

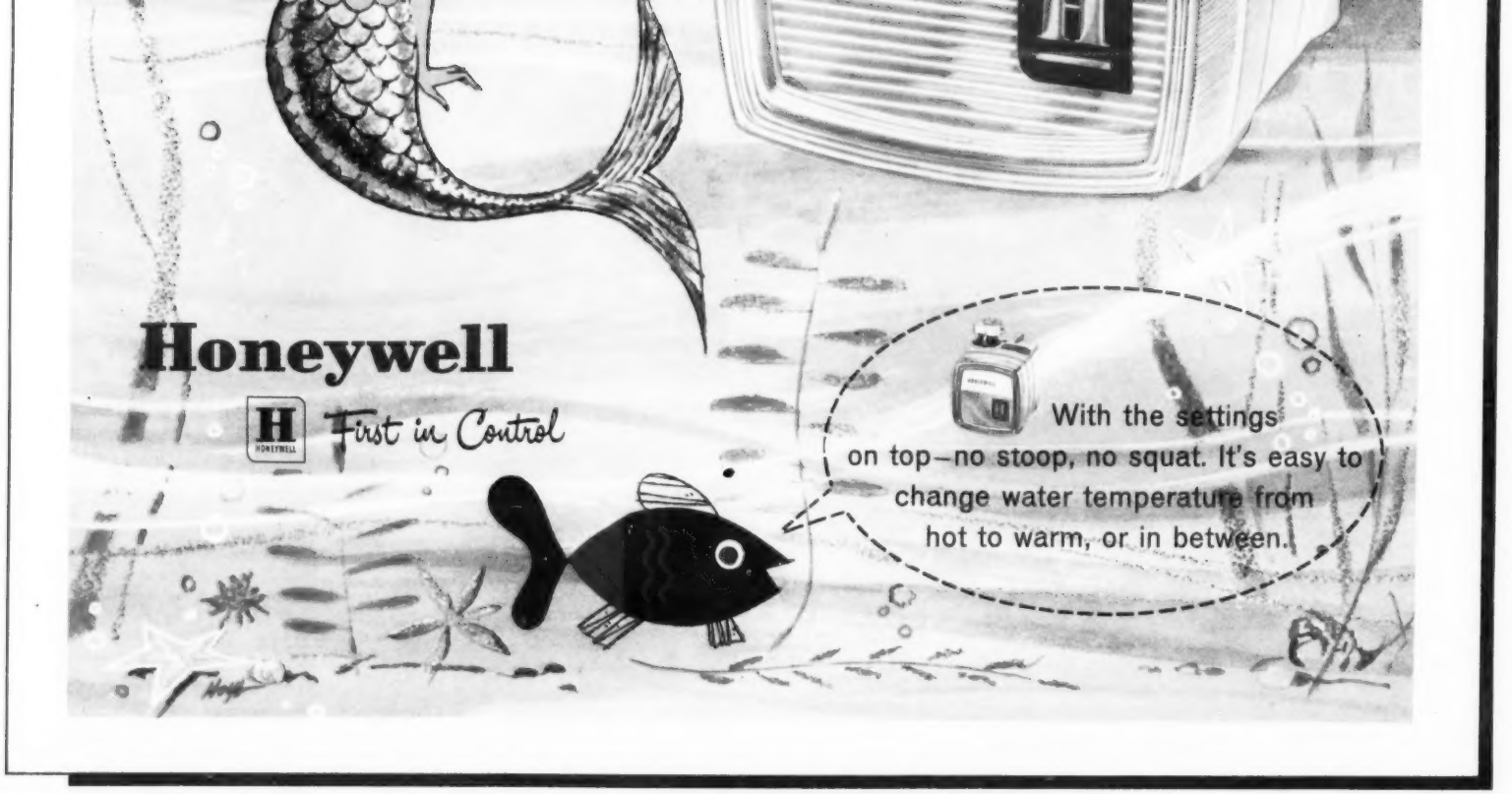
The utilization department is charged with all necessary service functions performed on the customers' premises, starting with the service regulator or meter, and including all appliances and equipment designed for the utilization of gas.

The ultimate goal of assuring our customers the most satisfactory and effective use of our product is achieved through the efforts of the many persons within the utilization department, whether they be assigned directly to customer service, or perform their duties in the shops, warehouse, office, or laboratory.

Our service policy provides free adjustment of all equipment other than heating and air conditioning, which are serviced on a charge basis. Charges are made for labor and material on all jobs requiring

YOU HAVE MORE TO SELL WITH CONTROLS BY HONEYWELL... NOW NATIONALLY ADVERTISED TO YOUR PRIME WATER HEATER PROSPECTS


It's only natural that the makers of the world's finest thermostats...
...also make the world's finest water heater controls.
HONEYWELL


Honeywell
First in Control
With the settings on top—no stoop, no squat. It's easy to change water temperature from hot to warm, or in between.

Shown above is the deluxe model V5131. Available with long or short element or tube — with or without pressure regulator.

This full-color ad will appear in over 4,000,000 copies of American Home and Sunset magazines, preselling Honeywell-equipped water heaters! It's just one more reason why—

"You Have More To Sell When You Sell Honeywell"

You sell more water heaters when they're equipped with Honeywell Controls

Standard Model V5130. Available with long or short element or tube, with or without pressure regulator.

HERE'S WHY:

- **TOP SETTINGS**—of both temperature and gas cock—mean greater convenience.
- **PRESSURE REGULATOR**—built right in—properly located in gas stream. Models available without pressure regulator.
- **SAFE LIGHTING INTERLOCK**—prevents accidental turning of gas cock to off position, once it has been put in pilot position.
- **UNIVERSAL DUOFILT FILTER**—the same filter resists clogging by both dust and gum—works on all gases.
- **BEST OF ALL—THE NAME HONEYWELL** on the control—a name your customers know and respect.

Add a real sales plus to your water heaters. Specify famous Honeywell controls.

Honeywell

H HONEYWELL *First in Control*

PART 1 THROUGH 9

• **First day**

Part I. Chemistry of Fuel Combustion

A general discussion of basic chemistry and combustion covering such items as combustion of matter, atoms and molecules, states of matter, production of heat by chemical activity, and necessary conversion of matter to gaseous form prior to combustion.

Part II. Gas Terminology and Distribution

Discussion of gas pressure, expansiveness of gases, measurement of pressure, and pressure requirements for gas distribution and utilization.

Part III. Chemistry of Gas Combustion

Lecture and classroom demonstration of various aspects of gas combustion as related to appliances in general with specific attention to the gas range. The following topics are covered in this part of the course:

a. Requirements for efficient combustion
b. Inadequate air supply
c. Transfer of heat
d. Effect of excess air
e. Limits of inflammability
f. Proper mixing
g. Heat to start and maintain combustion
h. Dissipation of heat
i. Flame speed
j. Yellow flames
k. Action in the flame
l. Reason for flame color
m. Production of soot
n. A smokeless flame
o. The blue flame
p. Primary and secondary air
q. Noisy flame
r. Lifting flame
s. Lowering velocity and flashback

Part IV. Things to Know About Burners

Demonstration, discussion, and student participation with emphasis on the following subjects:

a. Atmospheric and pressure burners
b. Gas range top burners
c. Function and description of orifice spud
d. Flow through the orifice
e. The mixer head
f. Kinetic energy and conservation of energy
g. Direction of gas stream
h. Shape of mixing tube
i. Object of mixing
j. Dimensions of mixing tube
k. Effect of poor mixing
l. Increasing pressure function of mixing tube
m. Effect of pressure on velocity
n. Effect of pipe diameter on velocity
o. Shape of mixing chamber

Part V. Range Burners and Their Behavior

Discussion and demonstration of the following:

a. Requirements of each burner port
b. Number of ports, port area, and heat requirements
c. Air adjustment
d. Height of utensil supports above flame
e. The adjustable orifice
f. Sizes and shapes of burners
g. Capacity and construction of simmer burners
h. Capacity and construction of main burners
i. Primary air adjustments of single and combination burners
j. Two-piece burners
k. Slotted burners
l. Heat distribution and port arrangement

Part VI. What Heat Is and How It Travels

Discussion and demonstration of the following:

a. Heat as a form of energy
b. Attraction of bodies for each other
c. Characteristics of a solid
d. Motions in liquids
e. Difference between temperature and heat
f. Excess air and flame temperature
g. Methods of heat transmission
h. Gas expansion, with temperature rise
i. Direction of heat flow
j. Radiation from flame
k. Domestic bake oven
l. Oven burner requirements
m. Oven heat distribution
n. Throttling the oven burner
o. Broiler and bake burners
p. Separate broiler compartments

(At the close of the first day, the students are asked to read Parts VII, VIII, and IX in preparation for the next day's work.)

• **Second day**

Part VII. Range Pilots, Valves and Regulators

Discussion, demonstration, and practical application of the following:

a. Range pilots
b. Flash tube and proximity ignition
c. Simple single burner gas valve
d. High-low gas valve
e. Needle valve adjustment
f. Combination gas valves
g. Dirt particles and dust
h. Gas filters
i. Gas, regulator operation and adjustment
j. Flow of secondary air to enclosed burners
k. Obstruction of air passages by customer
l. General need for secondary air

Part VIII. Thermal Expansion and Automatic Range Control

Classroom lecture and demonstration of the following:

a. Thermal expansion of various metals
b. Thermal expansion of liquids
c. Control elements for thermostats, thermometers, etc.
d. Rod and tube control
e. Relative motion and valve operation
f. Characteristics of Bi-metallic elements
g. Permanent change of shape due to overheating

Part IX. Automatic Range Controls

This portion consists mainly of practical application in the laboratory by the students, including disassembly, reassembly, calibration, and trouble diagnosis of oven heat controls, top burner heat controls, and various ignition systems. While much of this work is conducted with complete appliances (old or new), we also rely heavily on component parts, operating mock-ups, and various training aids developed by the training supervisors.

Our laboratory has all necessary facilities to place appliances in full operation for such training.

parts replacement, except where warranties are in force.

Obviously, the wide range of appliances serviced calls for highly skilled servicemen, backed up by all available resources. These resources must include constant training and reliable reference material.

In 1956 Citizens Gas launched a twofold program designed to provide these essentials.

The first part of the program consists of a standard training curriculum, composed of the following courses:

Course	*Length*
No. 1—Basic training	8 days
No. 2—Ranges and basic electricity	5 days
No. 3—Refrigeration	5 days
No. 4—Water heaters and incinerators	5 days
No. 5—Dryers and combination washer-dryers	8 days
No. 6—Basic heating	5 days
No. 7—Advanced heating and air conditioning	5 days

These courses are normally presented in the order given, and are complete with texts and examinations.

UTILIZATION DEPARTMENT

TRAINING EVALUATION REPORT

(Confidential)

NAME OF TRAINEE _____ CLOCK NUMBER _____

DATE OF REPORT _____

DESCRIPTION OF TRAINING _____

DATE COMPLETED _____ HOURS _____ NUMERICAL GRADE _____

CLASS AVERAGE _____

LOCATION OF TRAINING _____

	OUTSTANDING	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	BELOW MINIMUM STANDARD
COOPERATION					
PARTICIPATION					
APTITUDE					
PRACTICAL APPLICATION					
FUTURE POTENTIAL					

SPECIAL QUALIFICATIONS OR LIMITATIONS: _____

IS THE EMPLOYEE REASONABLY QUALIFIED TO HANDLE NORMAL WORK IN THE AREA COVERED BY THIS TRAINING? (IF ANSWER IS NO, GIVE REASONS).

SIGNED _____

FIGURE 1.

Sufficient time is scheduled between courses to allow the serviceman to gain valuable field experience, vital in the development of well-rounded personnel.

The second part of the program supplements the standard curriculum with special classes, field training, service literature, laboratory testing, and a central reference library available to all servicemen.

The overall program is naturally still in the development stage, with much refinement yet to be attained. However, a dynamically expanding gas industry will ever require progressive, forward-looking training methods with no room for complacency. We, therefore, hope, and feel certain, that our program will always be in a state of change and development.

It will be noticed that our standard training course No. 2 is entitled "ranges and basic electricity." The decision to treat these two topics in the same course was based on several considerations.

Ranges are among the first appliances our servicemen are called upon to service, and some fundamental knowledge of electricity is necessary to fully understand the operation of a modern gas range.

Introducing the serviceman to basic electricity also lays the foundations for future training on other appliances, virtually all of which contain some type of electrical circuitry.

This course is composed of nine major parts, plus the one on electricity, which are covered in five days. Topics, and the order in which they are treated, are: (1) chemistry and fuel combustion; (2) gas terminology and distribution; (3) chemistry of gas combustion; (4) things to know about burners; (5) range burners and their behavior; (6) what heat is and how it travels; (7) range pilots, valves, and regulators; (8) thermal expansion and automatic range control; (9) automatic range controls; and (10) basic electricity. *(See the accompanying boxes for outlines of the subject matter covered.)*

Covered on the first day are Parts 1-6; Parts 7-9 on the second day. The third and fourth days are devoted to basic electricity.

The morning of the fifth day is devoted to practical work on appliances under close supervision to determine the extent to which the students have absorbed the previous four days of training, and to discover individual aptitudes and abilities.

Immediately after lunch, the students are given a written examination covering all parts of the training. This is a two-part test, consisting of multiple choice questions and problems requiring complete written answers.

After the examination is completed and all papers have been collected, the test questions are reviewed. Correct answers are supplied by the training supervisor to prevent any misunderstanding on the part of the serviceman.

The balance of the day is devoted to general review of the entire course. Each serviceman retains his copy of the text book for a permanent reference.

Although the course is presented here in outline form, our classroom text explains each subject in detail, resulting in a text book of about 100 standard 8½ x 11 typewritten pages. We realize that so great an amount of information cannot be completely absorbed in only five days. Therefore, the amount of classroom time devoted to the different subjects varies widely, with greatest emphasis placed on demonstration and practical problems. The students are urged to reread the textbook at their leisure and refer any questions they may have to the training supervisor.

Ernest Polston, Citizens Gas training supervisor, does experimental work in appliance laboratory.

BASIC ELECTRICITY

• Third day

Part X. Basic Electricity

The need for a general knowledge of the fundamental principles of electricity is self-evident when consideration is given to the complexities of modern gas appliances.

In entering this phase of the training we assume no previous schooling in electricity, and attempt to effect the transition from gas to electricity by explaining concepts common to both, as explained in the following introduction, which is given as it appears in our text:

Introduction

Electricity is not one of the products sold by our company, but we do depend on it in many ways. The demands of competition and the modern public bring about many wonderful and useful features of the gas-burning appliance. Many of these features depend on electricity for the energy to make them function. Each year we see more and better changes in these appliances, so if we are to do our usual good job of servicing gas equipment, we must learn to service the electrical parts and wiring as well as the gas burning parts. This does not mean that we must know the complete theory of electricity or electronics but a few simple facts that will help us in our everyday work.

Possibly some of you know that it is not always necessary to plug an appliance into an electrical outlet to generate the electricity, to make the controls function. We encounter this nearly every day when we light a pilot that heats a thermocouple. As heat is applied to this thermocouple, it generates the electricity to perform the work that it is designed to do. This is not a new thing but there is much to be learned about it. This is but one method of generating electricity. It can be produced chemically, such as in batteries or by converting any type of energy into electrical energy such as solid fuels, gas, oil, steam, etc.

The law of conservation states that we cannot create nor destroy energy. This applies to electricity. We do not make electricity but merely cause it to flow and perform work for us. Electricity is usually measured by the work it performs. In ordinary wiring, it is a simple process for people experienced in this work to determine the requirements.

We could easily compare the flow of electricity with the flow of gas. In either case the flow is determined by the amount of force or "push" available and the resistance to that force.

The force is expressed as "pressure" when we speak of gas and "voltage" when we are dealing with electricity.

Likewise, the term resistance is used in gas work, while in electrical work the term "ohms" is used.

While we are usually free to alter the pressure or voltage if necessary, the resistance of a given size pipe or wire is constant. Therefore, we must choose our pipe or wire size with great care.

A gas pipe which is too small for the volume of gas required will result in too much pressure loss, while a wire which is too small will result in excessive voltage drop, overheating, or both.

The relations between terms used in gas work and electrical work are as follows:

	Volume flow	Moving force	Resistance
Gas	cu ft/hr	pressure	resistance
Elec.	amperes	voltage	resistance

The resistance to the flow of gas in a pipe depends on the size, roughness, and length, while the resistance to the flow of electricity in a wire depends on the material, size, and length, much in the same manner.

Section 1. General

Discussion and demonstrations of the following subjects.

a. Direct current
b. Alternating current
c. Polarity
d. Return lines
e. Ground return
f. Heat from electricity
g. Protection from overheating
h. Safety precautions

Section 2. Components and Instruments

Discussion and demonstrations of the following subjects:

a. Switches
b. Operating parts in parallel
c. Parts in series
d. Transformers
e. Relays
f. Electro magnets
g. Solenoids
h. Magnetic flux
i. Voltmeter
j. Millivoltmeter
k. Ammeter
l. Ohmmeter
m. Voltohmmeter
n. The test light

Section 3. Electric Motors—General

Discussion and demonstrations of the following:

a. Usage
b. Current to motor
c. Motor stalls
d. Overload protector switch
e. Belt tension
f. Occasional failure to start
g. Centrifugal switch
h. Motor fails to stop
i. Pulley adjustment
j. Continuous or intermittent operation

Section 4. Procedure for Replacing Motors

Lectures and discussion of utility motor exchange policy, including exchange prices, new prices, warranties, etc.

Section 5. Motor Maintenance

Discussion of the following:

a. Oiling
b. Cleaning
c. Reclaiming motors that have been under water

• Fourth day

Section 6. The Millivolt Circuit

Discussion and demonstrations of the following:

a. The standard thermocouple
b. Open circuit readings
c. Closed circuit readings
d. Importance of the pilot flame
e. The nonaerated pilot
f. Pilots that generate higher millivoltages
g. Field test methods without instruments
h. Practical wiring problems

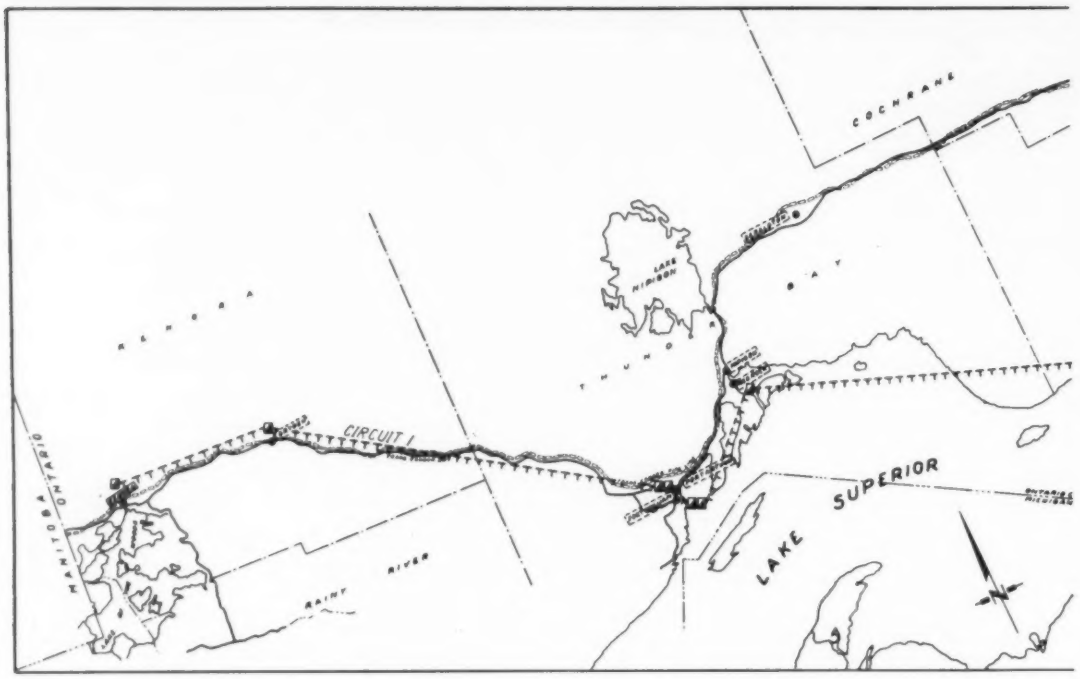
Complete individual records are kept of each serviceman's grades, and follow-up field training is provided when required. The final determination of service qualification is based on all aspects of the serviceman's contact with the training department, and he is notified of the results through proper supervisory channels via the standard form shown in *Fig. 1*.

In the final analysis, the effectiveness of a training program must be measured by the quality of service rendered the customer.

Good service is efficient service, resulting in more economical operation. Costly callbacks are held to a minimum, time is saved, and the need for close field supervision and assistance is lessened.

Our program has materially shortened the time necessary to develop skilled servicemen and has proven a useful tool for evaluating individual qualifications.

The part played by service training in strengthening the gas industry's position in the highly competitive appliance field can scarcely be overestimated. ■



Telemetering in Northern Ontario

Northern Ontario Natural finds its telemetering system vital

- **to maintain high load factor**
- **to stay within daily contracted demand**
- **to observe system operating pressures**

By E. E. BAGLEY, Chief of Operations
Northern Ontario Natural Gas Co. Ltd.
Toronto, Ontario, Canada

GAS exclusive

THE telemetering of static and differential gas pressures is certainly not new to the gas industry. However, we feel that the application, method and area covered makes our installation unique in Canada. The approach to our problem has been direct and practical to obtain the desired results at a feasible cost for installation and operation.

The installation and completion of 33 natural gas distribution systems extending from Kenora to Orillia, Ontario, a distance of approximately 1165 miles, was achieved in late 1958. These systems are supplied natural gas from Trans-Canada Pipe Lines, Ltd., mainline at 24 points along the route from the Manitoba border to a point 80 miles north of Toronto.

With an operation extending over the rugged North country, purchases of gas direct from the pipeline company at numerous points, volume storage impractical, peak shaving equipment unfeasible and very rigid penalties for gas purchased over daily contracted demands, it is very obvious that efficient and effective gas dispatching will play a vital part in the economic development of our company. To facilitate an operation of this kind, all gas must be sold in two major categories: firm (domestic, commercial and industrial) and interruptible (industrial). Gas sales

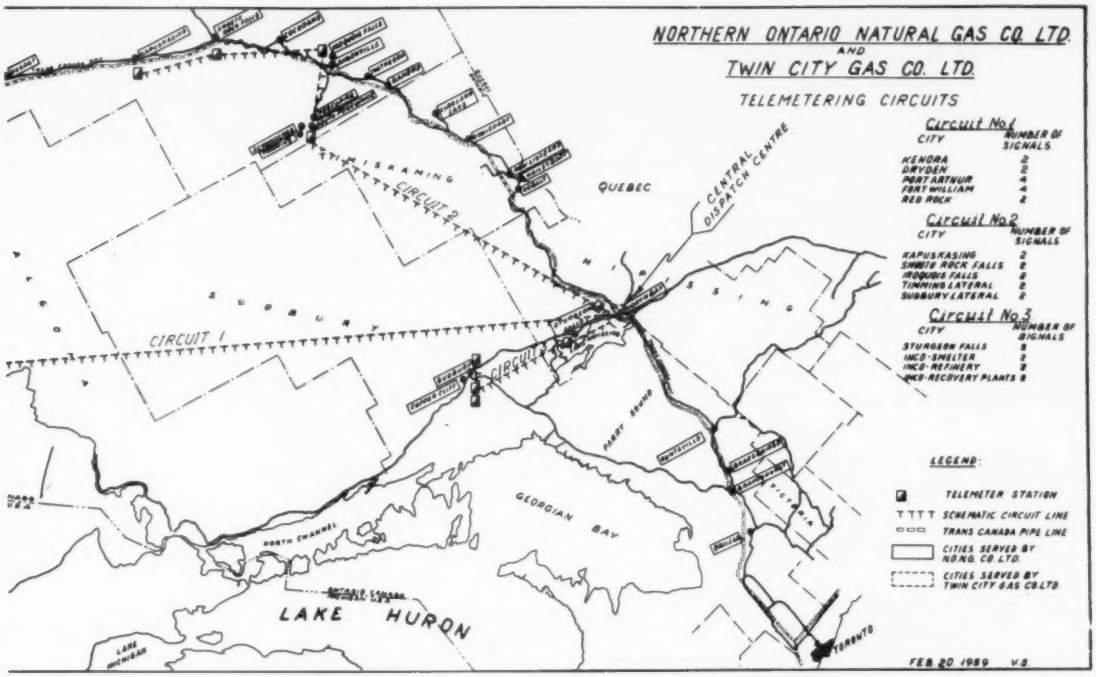


Fig. 1. Telemetering circuits of Northern Ontario Natural and Twin City Gas Co.

are carefully made in these two categories by "block" volumes of corresponding amounts. This makes it possible to set the "daily contracted purchase demand" for sufficient quantities of gas to supply firm gas customers during the peak consumption winter months and sell the same quantities of gas to interruptible customers during the off peak consumption summer months. Load balancing is imperative to maintain a high load factor, in order to keep the cost of gas purchased within reasonable limits.

In order to maintain the necessary high load factor, make certain we do not exceed our daily contracted demand and constantly observe our system operating pressures, a telemetering system is mandatory.

A study was made in early 1958 by our operating staff to determine the requirements and to appraise the equipment on the market that would best fit these requirements. The "audio tone" system was considered, as the purchase and installation cost was favorable, the provision for future expansion and additions at minimum cost was excellent, the system offered flexibility; however, the lease wire cost for signal transmission was very excessive. The use of microwave transmission of signals was also found to be impractical due to mineral deposit interference enroute, Northern atmosphere interference and again, the excessive cost. The "electrical impulse time signal" system was found to fit our requirements with reasonable purchase and installation cost (approximately the same as audio-tone), expansion and additions limited in the Western section only, reasonable lease wire cost for signal transmission (approximately one third of audio-tone), simplicity for operation, repair and maintenance.

The decision was made to employ the electrical impulse time signal system and use leased wire facilities. The equipment was purchased from the Bristol Co. of Canada, Ltd. Installation was made by company personnel under the supervision of the gas measurement section. The system was synchronized, tested and placed in operation by Bristol technicians and company personnel.

The central dispatch center for Northern Ontario Natural Gas Co. Ltd. and affiliate Twin City Gas Co. Ltd., is located in North Bay, Ont. The signal transmissions are made, due to geographical location, over three separate circuits leased from the Bell Telephone Co. of Canada.

Circuit No. 1 transmits the static and differential pressure signals from Kenora city gate station, Dryden city gate station, Port Arthur city gate station, Abitibi Power & Paper Co. paper mill in Port Arthur, Fort William city gate station, Great Lakes Paper Co. paper mill in Fort William and Red Rock city gate station. *(see Fig 1).*

Circuit No. 2 transmits signals from Kapuskasing city gate, Smooth Rock Falls city gate, Iroquois Falls city gate, Timmins lateral city gate and the Sudbury lateral city gate station *(see Fig. 1).*

Circuit No. 3 transmits signals from three large plants of International Nickel Co. of Canada, Ltd. at Sudbury and the Sturgeon Falls city gate station. *(see Fig. 1).*

These three circuits, employing self-synchronizing

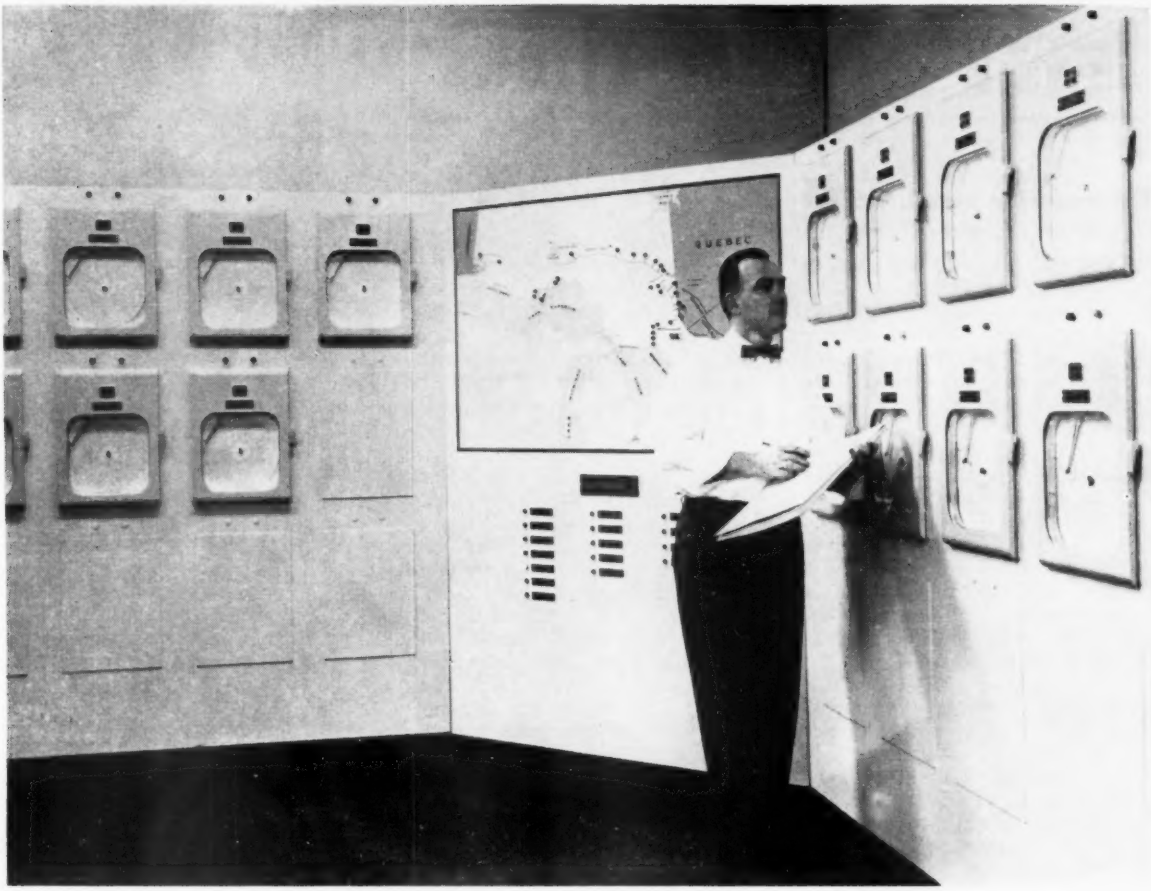
time multiplexing equipment, are capable of transmitting 45 signals. However, the present plans are for 32 signals transmitted from 16 points. System expansion is now under study and will be based on growth requirements. Studies are also being made for remote control on transmission lateral lines and regulator stations supplying the distribution system. This remote pressure control system can be adapted very readily at a nominal cost to the existing telemetering system with complete pressure control from the central dispatch center. The 19 small cities and towns which do not have major industrial loads have been omitted from the present telemetering circuits as the purchased pipeline gas can be accurately projected without the assistance of telemetering.

The transmitter installations *(Fig. 2)* consist of one Bristol static pressure indicating transmitter range 0-100 psig, one Bristol differential pressure indicating transmitter (mercury monometer type), and one Bristol multiplex transmitter with relays and power pack. This equipment is mounted in a steel case (insulated and heated) supported by the meter run. This equipment must be protected against temperatures ranging from —30 deg. to —50 deg F as well as snow and rain storms.

The dispatch receiving panel *(Fig. 3)* is constructed in three sections of ¼-in. steel plate, welded to a self-supporting angle iron frame. The entire panel is painted mist green with the center section displaying a colorful map of the entire system. Pilot light on the panel will flash to indicate the location of the cities and the static and differential pressure signals as each transmitter functions. The Bristol dual (two-pen) receivers mounted in the wing sections of the receiving panel will record the static and differential pressures on 12-in. circular square root charts at 5-second intervals. The dispatch receiving panel has been designed for system expansion up to 27 receiving instruments.

The central dispatch center is under the supervision of Chief Dispatcher Stanley C. Hanna, who will be assisted by three dispatchers working 8-hour

Fig. 2. Transmitter installations along Northern Ontario's 1165-mile system.



S. C. Hanna, chief dispatcher, checks information on dispatch receiving panel.

shifts. The gas dispatch program is under the direction of Superintendent of Gas Measurement Lane Ferguson.

The entire system has been established in order that the large industrial veritable gas loads may be under close surveillance and control at all times. Small loads which include domestic and commercial customers will also be projected and a definite load pattern with relative degree day deficiencies plotted. The coverage of our existing facilities has proven to be quite adequate to date. However, if the need arises, additional transmitter points can be placed in service at a nominal cost.

With the purchase of gas at pipeline pressures ranging from 600 psig to 920 psig, it is the responsibility of our company to "stage" the pressure reduction down to the normal distribution system pressure of 10 psig. Supervision of pressure reduction equipment operation is visual to the gas dispatcher with the static pressure record at the dispatch center. The transmission of static pressure readings has proven invaluable to all phases of system operation. The dispatcher on duty can detect system failures in the advance stages and dispatch men and equipment to take corrective measures, thereby eliminating the possibility of interruption of service to our customers.

To date we have found that this type system requires little or no maintenance. However, provisions have been made to stock replacement units at strategic points in order to change out any defective transmitter units and return them to the factory for repairs. This will insure immediate restoration of signals in case of equipment failure and eliminate the necessity of a specially trained technician in each circuit area. Due to the wide area covered and adverse winter weather conditions, we feel this is a practical approach.

Our company and affiliate company are presently serving 4300 customers a maximum daily demand of approximately 73 MMcf of natural gas. With distribution system construction completed in December 1958, and the gas dispatch section accurately projecting volumes of this size, we feel we have made the first step to effective gas sale and purchase control. We optimistically approach 1959 as a blue flame year in Northern Ontario. ■

GAS • ASSOCIATIONS

Transmission men head for Dallas meet, May 18-19

Some 500 men are expected in Dallas May 18-19 for the AGA transmission conference. Meeting place is the Statler Hilton Hotel.

Two general sessions are slated for the mornings; nine sessions are slated for the afternoons.

Presiding at the first general session on Monday, May 18, will be transmission committee chairman R. V. Campbell of American Louisiana Pipe Line Co. Microwave, gas storage in water sands, and computer applications will be discussed by D. E. York of United Fuel Gas Co., Douglas Ball of Ball Associates, and H. M. Joiner of Peoples Natural Gas Co., respectively.

The session will close with a panel on the proven applications of compressor station automation. Participating with moderator W. C. Day of Columbia Gas will be D. L. Corkill of Northern Natural, George Fields of Southern Natural, R. D. Milam of American Louisiana, and J. E. Wallace of Hope Natural.

The Eighth Annual Report on Underground Storage Statistics will be presented by L. R. Kirk, Ohio Fuel Gas Co., at the first general session.

The second general session will have an international flavor with French and Canadian gasmen joining U. S. gasmen. J. LeGuellec, chairman of the board of Gaz de France, Paris, will tell about the gas industry in his country while E. V. Hunt of Alberta Gas Trunk Line Co. Ltd. will describe construction, testing and operation of a Canadian gas system. IGT's G. G. Wilson will report on the interior coating of pipe and C. E. Terrill of Southern Natural will discuss the whys and wherefores of offshore gas measurement.

Also presented at the second general session will be a talk on progress being made in solar weather research by Dr. Walter Orr Roberts of the University of Colorado's High Altitude Observatory. The final paper will be on pipeline research as carried out under the AGA PAR plan, by D. C. Benson of Texas Gas Transmission.

Sessions on Monday afternoon will cover communications and telecontrol, compressor stations, gas measurement and pipelines. On Tuesday afternoon, gas dispatching, underground storage, compressors, pipelines, and communications will be featured.

Newly elected officers of the New England Gas Association are (front row, from left): president George R. Copeland, president of Algonquin Gas Transmission Co., Boston; retiring president Andrew W. Johnston, vice president in charge of gas operations, Boston (Mass.) Gas Co.; 1st vice president Gilbert J. Williams, executive vice president of Connecticut Light & Power Co. Back row: 2nd vice president Harold L. Dalbeck, president, gas division of New England Electric System; treasurer Burdette A. Johnson, New England Gas & Electric Association; and NEGA managing director Clark Belden.

Industry's decade of decision faced by SGA

Southern Gas Association's 51st annual convention is expected to attract more than 2100 visitors to New Orleans on April 27-29. The entire program is shaped to the problems of the gas industry's "decade of decision"—the 1960's.

On display will be many products from research labs that will be featured by the gas industry, today and tomorrow: Whirlpool's Miracle all-gas kitchen, Gold Star ranges, table top water heaters, and the new gas refrigerators and air conditioners.

Here are some of the highlights of the program:

General sessions: SGA's President Carl Cloud will give the traditional president's address at the opening session. The panel of presidents, representing the three branches of the gas industry, will

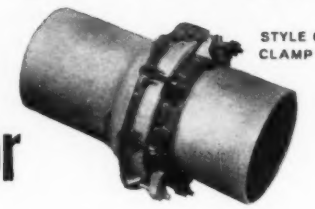
There is a Dresser®

STYLE 38 6-BOLT COUPLING

pipe coupling, fitting,

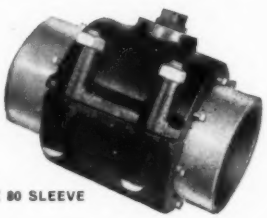
STYLE 90 STREET TEE

repair clamp,



STYLE 60 CLAMP

or repair sleeve



STYLE 80 SLEEVE

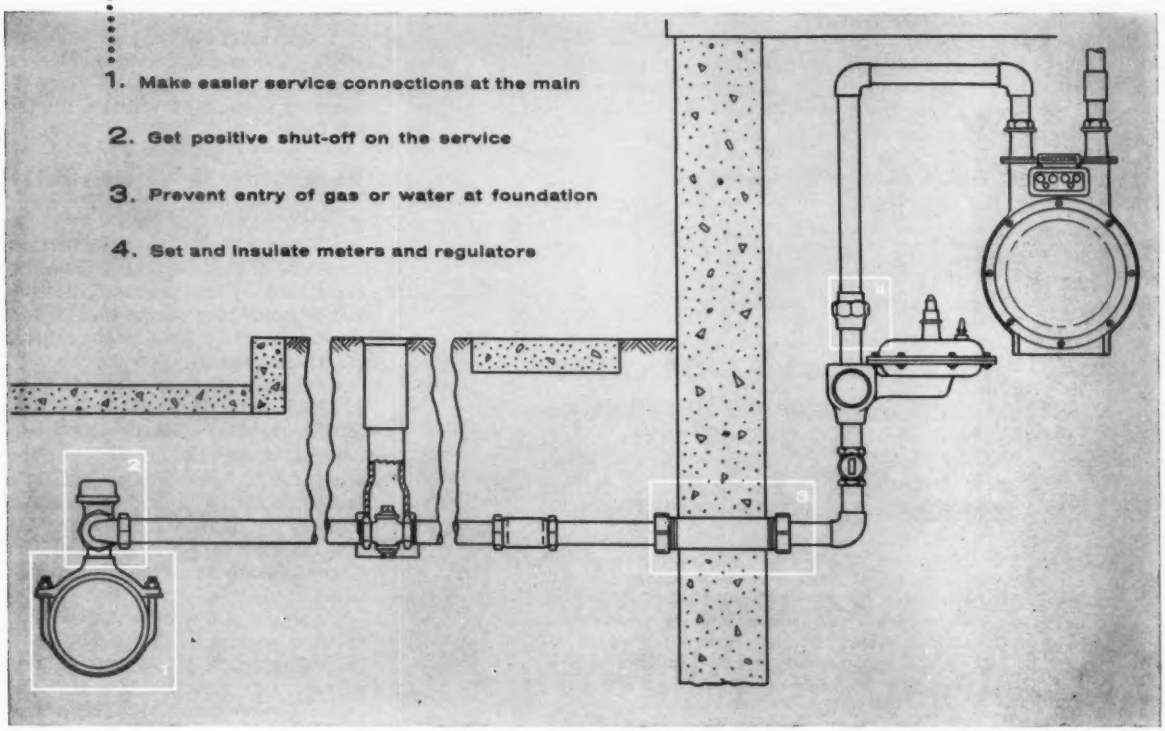
for every need

Only Dresser manufactures a complete line.

DRESSER MANUFACTURING DIVISION

Bradford, Pennsylvania

Four ways to simplify service line installations:


1. Make easier service connections at the main
2. Get positive shut-off on the service
3. Prevent entry of gas or water at foundation
4. Set and insulate meters and regulators

1. Make service connections at the main

NEW STYLE 91 SERVICE SADDLE gives you a quicker way to make permanent connections on steel or cast-iron pipe. High tensile steel straps conform snugly to the outside of the pipe; broad bearing surface prevents cutting or crushing. Available with single or double strap, tap size up to 2-inches.

2. Get positive shut-off on the service

NEW STYLE 90 CONVERTIBLE TEE (shown above with 90° Street Ell as a swing joint) serves both as a service connection or as a safe positive shut-off on pressures up to 250 psi (or 150 psi for the malleable style). Meets ASA requirements that provision always be made for sealing off abandoned services. Furnished with either threaded end or beveled for welding.

3. Prevent entry of gas or water at foundation

NEW "WALL-SEAL"...a simple leak-proof method of sealing between the wall opening and service pipe. Simply use a threaded nipple . . . and two special Dresser compression follower nuts and wedge gaskets. Eliminates the aggravation of having to pack the space with tar, rags, etc.

4. Set meters and regulators

NEW INSULOK ADAPTER...insulates, simplifies and speeds setting of regulators and meters. Blocks harmful flow of current between house and main. Virtually tamperproof. Can be used practically anywhere on the riser, on the high or low-pressure side of regulator...indoors or out. Facilitates pre-make-up of the riser assembly in shop or truck.

Unlike welded or threaded connections, the Dresser method gives you a non-rigid service which will absorb ordinary stresses and movement without leakage or damage. Dresser® special-compound gaskets stay resilient and gas-tight for the life of the line, And regardless of the type or location of the connection, a Dresser fitting goes on faster... the only tool you need is a wrench. The complete line of Dresser service fittings includes "a product to meet every practice."

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MANUFACTURING DIVISION
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New York • S. San Francisco • Toronto & Calgary

be featured on Wednesday, April 29.

Accident prevention: Justin Wilson, Baton Rouge safety consultant, will present a talk titled "Build a Safety House." Other speakers are Carl Cloud and Harold Bleakley, ABCO Inc., Erie, Pa.

Accounting: Speakers include Robert A. Shiff, National Records Management Council; David N. Lieberman, of Peat, Marwick, Mitchell & Co.; Dean M. M. Hargrove of the College of Business Administration at the University of Tulsa; and Dr. J. H. Lumpkin of Rohrer, Hibler & Repolgle, Dallas.

Distribution: Speakers include George S. Coates, Southern Counties Gas Co.; Chester L. May, retired senior vice president of Lone Star and board chairman for Arkla Air Conditioning Corp.; and B. T. Mast, Trunkline Gas Co., and Dr. James M. Sharp, Southwest Research Institute, reporting on SGA's study of non-destructive inspection of steel pipe.

Human relations: Speakers include Arthur M. Doty, Aluminum Co. of America, and Carroll E. French, Industrial Relations Counselors Service Inc.

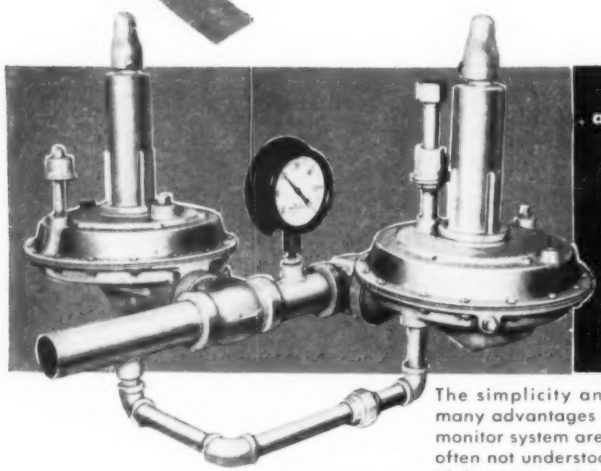
Sales: D. W. Weir, Arkansas Louisiana Gas Co.; L. W. Crump, Oklahoma Natural Gas Co.; Al Pollard, public relations expert from Little Rock; and S. F. Wikstrom, director of AGA's PAR plan will be on the program. Tuesday's session will be devoted entirely to gas air conditioning.

Transmission: Pipeline problems and solutions will be presented by H. N. Mallon, chairman of Dresser Industries Inc.; and John H. Williams, president of William Brothers Co.

Reynolds offer

UPSTREAM MONITORING

The monitor systems give continued regulation at a slightly higher pressure without relieving gas or shutting off the gas. This system can handle temporary or permanent failures of the operating regulator. The monitor is in semi-operation when the operating regulator is functioning properly. Therefore, you have both regulators in motion at all times. The cost of an operating regulator and operating monitor regulator is less than the cost of a regulator and a full capacity relief valve with its vent piping or the cost of a regulator and shut-off valve.



a wide range

Reynolds is one of the principal advocates of the monitoring system. For this purpose they manufacture a wide range of monitor regulators.

The simplicity and the many advantages of the monitor system are quite often not understood until demonstrated. Inquire for demonstration model.

REYNOLDS GAS REGULATOR CO., INC.

Anderson, Indiana

A Subsidiary of Arkansas Louisiana Gas Company

Rochester, N. Y., attracts production group

Nine sessions and inspection trips to Rochester Gas & Electric Corp. are on the program for the AGA production conference slated for the Sheraton hotel in Rochester, N. Y., May 25-27.

Under the chairmanship of Hugh T. Maloney, Philadelphia Gas Works, the first general session will hear a report from section vice chairman S. W. Horsfield, Long Island Lighting Co.; a welcoming address from Rochester's mayor; and the keynote address from R. E. Ginna, chairman of the Rochester Gas board.

Papers will be presented during the first session by C. L. Pendleton, New England Electric System, discussing safe practices for standby plant operations; A. H. Wicht and Irving Deutsch, Long Island Lighting, discussing factors affecting stability of odorants in gas mains; and Dr. Minor C. K. Jones, Esso Research & Development Co., who will cover areas of mutual interest in the gas and oil industries.

Among talks to be presented at the second general session are papers on industrial practice in the case of standby production equipment by D. A. Dundore of Philadelphia Gas, and on gas dispatching by C. M. Springer of Transcontinental Gas Pipe Line.

On the first afternoon, there will be two sessions on fluid fuels and odorization. The second morning will feature two parallel sessions on manufactured gas production and chemicals and engineering. That afternoon, sessions will be held on gas conditioning, solids fuels, and manufactured gas production planning.

PR conference will study public opinion survey

Results of a national public opinion survey will be studied at the gas industry's first national

public relations conference in Chicago, June 15-16.

The two-day conference at the Edgewater Beach Hotel is cosponsored by the American Gas Association and the Independent Natural Gas Association of America. AGA and INGAA also are joint sponsors of a public opinion survey now being concluded by Opinion Research Corp., Princeton, N. J.

"Public Relations Challenges of the Gas Industry" is the theme of the June 15 sessions, which will open with a realistic appraisal of "How the Public Looks at the Gas Industry." The tentative program for the day includes an address on the value of opinion studies, a panel discussion by PR directors of gas companies on the significance of the survey report, and separate viewpoint presentations by leaders of gas producing, pipeline, and distributing companies. The role that business should fulfill in politics will be the subject of a dinner meeting talk.

The second day of the conference will be geared to deciding "Where Do We Go From Here?" It will be highlighted by a panel of national authorities discussing government ownership in gas, rates and public opinion, stockholder relations, employee communications, and customer relations. A feature of the meeting will be an interrogation of these experts by gas industry public relations people.

Co-chairmen of the conference are John M. Hollingsworth, Iowa-Illinois Gas & Electric Co., and George W. Anders of Texas Gas Transmission Corp.

1st air conditioning school planned

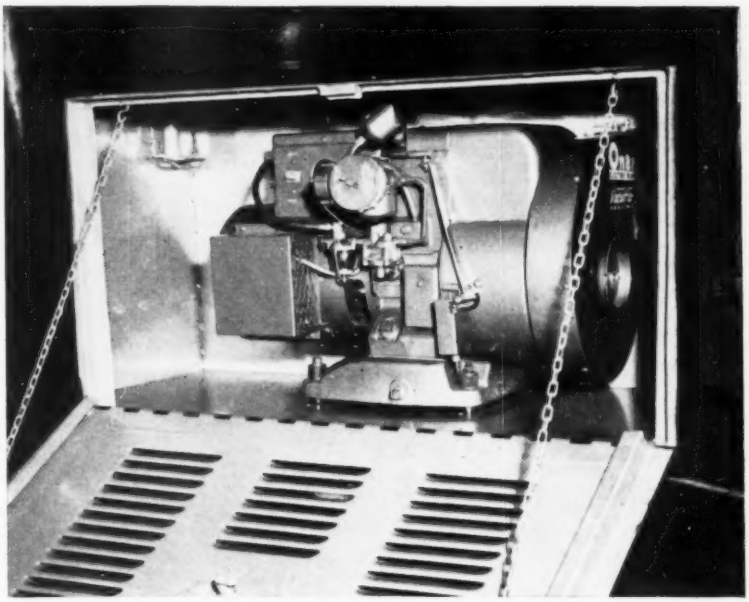
The air conditioning and heating committee of the AGA industrial and commercial gas section will present its first gas air conditioning sales school at the Baker Hotel in Dallas, June 1-5.

A series of lectures on fundamentals of air conditioning will launch the school. The various types of systems, the refrigeration machine, air handling equipment, controls and accessories will be discussed. Lectures on reciprocating and centrifugal compressor systems will stress the suitability of the gas engine and its characteristics of meeting varying demands of cooling load. Part of one lecture will be devoted to steam turbines as prime movers for compressors, together with an analysis of steam

Onan ELECTRIC PLANTS

ELECTRIC PLANT NEWS

Onan ELECTRIC PLANTS



New dual-purpose Onan plants deliver A.C. power for tools; 30 amps for battery charging!

1,000 and 2,000-watt models available

Mounted in maintenance and construction vehicles, these two new Onan Electric Plants cut costs two ways.

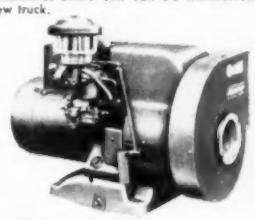
First, they provide plenty of plug-in A.C. power for floodlights and motor-driven tools.

Second, they keep communication batteries charged without running the truck engine. The 30-ampere, 12-volt output handles the drain of 2-way radio and battery-powered lighting.

The difference in fuel cost between the single-cylinder Onan engines in the 2 to 4 H.P. range and truck engines of 150 H.P. or more has been reported as high as $800.00 per year or approximately twice the cost of the 1KW plant. To these fuel savings must be added savings in engine maintenance and reduction in labor costs.

These plants can be mounted within the truck body or above the cab in an Onan weatherproof steel housing. Leading body builders will install them to order. Plants are electrically started from the truck cab. Separate charging circuit keeps starting batteries charged. Call your Onan distributor for the whole story.

OVER-THE-CAB MOUNTING
Protected by Onan steel housing. Plant easily accessible. Entire unit can be transferred to new truck.



MODEL 1AJ-1RV1330
1,000 watts, 115 volts, 60-cycle with 30-amp. 12-volt battery charging output. One-cylinder, air-cooled Onan AJ engine.

See your Onan distributor or write for information

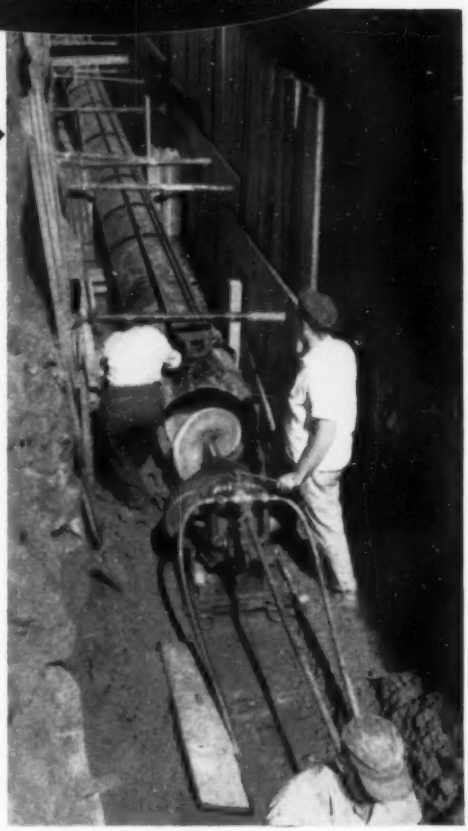
D. W. ONAN & SONS INC.

2859 University Ave. S.E., Minneapolis 14, Minnesota

ELECTRIC PLANTS • AIR-COOLED ENGINES • KAB KOOLER • GENERATORS

Onan ELECTRIC PLANTS

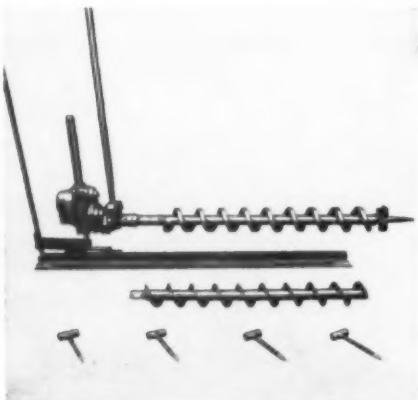
Drilling with KA-MO...



24-in. x 106-ft. bore *in only 4 hours!*

To install a gas distribution line under a railroad bed, this Ka-Mo 24" diameter horizontal drill bored a hole 106' long through hard compacted clay and ballast. Actual drilling time *took only 4 hours!* Drill was powered by an 18 h.p. air motor and installed casing as it made the bore. This fast, safe method of drilling and casing installation protects railroads, highways, etc., against costly cave-ins.

Next time you have a drilling problem, check the big Ka-Mo line. Drill sizes 2" to 48" dia. and larger . . . in sectionalized lengths . . . air, electric, hydraulic, gasoline, or diesel powered . . . tailored to meet your own particular requirements. Information is available at no obligation. Just call us, or mail coupon today.



Speeds installation of gas distribution lines

Here's a "close-up" of a 6" dia. horizontal drill with 6 h.p. vane type air motor and single-track mounting. It's light, portable, easy operating. Speeds installation of distribution and service lines under walks, streets, railroad beds, etc. Other sizes in this series: 3" to 14" dia. in sectionalized lengths with single or double-track mounting.

Mail to: KWIK-MIX CO., KA-MO Tools Dept., 1845 South 55th Ave., Cicero 50, Illinois

NAME .....
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Send free data on:
☐ horizontal ☐ vertical
☐ angular drilling equipment
Dia. of hole ..... in.
Length of bore ..... ft.
Type soil .....

KAM907 GAS

KA MO KWIK-MIX COMPANY — Ka-Mo Tools Dept.
A DIVISION OF KOEHRING COMPANY

pressures most suitable for this type of operation.

Slides will be a part of most lectures, especially to present case histories of typical installations.

AGA's air conditioning research program will be presented as well as reports on progress being made in the two-stage absorption cycle, the gas engine-driven air conditioning heat pump and the free piston engine.

Each year at its mid-year sales conference, the Pennsylvania Gas Association honors an individual or group for outstanding contribution to the development of the gas industry. This year the AGA was so honored for its research and development work. E. H. Smoker (left), president of United Gas Improvement Co. and chairman of AGA's domestic research committee, accepted the award for AGA. Looking on are W. H. Regan (center), chairman of PCA's sales promotion committee, and C. M. Swan, PGA president.

Underground corrosion program completed

The program for the fourth annual Appalachian underground corrosion short course at West Virginia University has been completed. This year's session is slated for June 2-4 at West Virginia's School of Mines in Morgantown. Number of classes has been increased to 64 this year.

The school covers basic, intermediate and advanced education on the following subjects: Fundamentals of underground metallic corrosion and corrosion control practices as related to underground pipe and cable systems (32 1½-hr classes); Coatings—corrosion control materials and material control practices (8 classes); and a special section on instrumentation, materials and test procedures (16 classes).

GAS • PEOPLE

M. Anuskiewicz
Brooklyn

W. B. Cameron
Brooklyn

MICHAEL ANUSKIEWICZ is the newly elected assistant chief engineer of Brooklyn (N.Y.) Union Gas Co. WILLIAM B. CAMERON is now engineer of development and planning. Anuskiewicz, with Brooklyn Union since 1929, rose through a series of posts in the manufacturing department. In 1945 he became assistant engineer of development and planning and three years later was chosen its head. Prior to his recent appointment, Cameron was assigned to the commercial, auditing, manufacturing and construction departments.

R. M. MCINTYRE has been appointed manager, residential sales, of Southern Counties Gas Co., Los Angeles. McIntyre, who has been serving as market development manager, will be responsible for functional control of all residential sales activities and of market development for SoCounties.

White-Rodgers Co., St. Louis, has created a new marketing and research division and named JOHN H. MARTIN as manager of the division. Combining the functions of several previous groups, the new division is charged with research and reporting of marketing trends affecting sales, distribution, and production of controls. In addition to

Continued on page 92

R. M. McIntyre
SoCounties

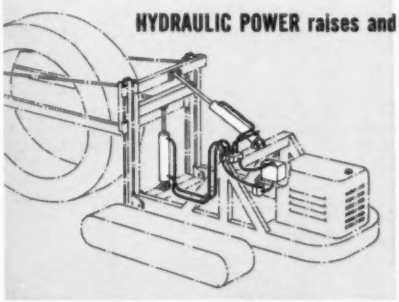
John Martin
White-Rodgers

Operating on a limited budget?

Then check what this economy-size Parsons® 130 can do for you...

Here's a good, small, wheel-type ditcher in the popular low-price range that's big enough for main line trenching . . . yet, economical on extensions, service lines and other utility jobs. You get 12 inches to 18 lineal feet of trench per minute . . . 12 to 24 inches wide . . . at depths to 5¾ feet. Low in price, big in capacity, this Parsons 130 is built to the same heavy-duty high-quality standards of larger Parsons wheel Trenchliners. It has hydraulic wheel-hoist on power-tilt mast. Shiftable, reversible belt conveyor gives controlled discharge (hydraulic conveyor drive optional). To handle a wide range of soil conditions, heavy-duty digging wheel is equipped with cast-steel buckets with self-sharpening, reversible "Tap-In" teeth, quick-change gumbo buckets, retractable bucket-cleaner. Low-cost 130 also has 12-in. integral pad and rail-type crawlers. Tractor-type crawlers optional with 12-in. flat or 16-in. grouser shoes. See Parsons distributor — soon! 4 larger wheel-type, 5 ladder-type Trenchliners also available for any size trench from 6 inches to 6 feet wide, up to 19 feet deep.

HYDRAULIC POWER raises and lowers the wheel... and tilts the mast



Specified grades are easy to maintain with Parsons 130. Hydraulic ram on vertical mast raises and lowers the digging wheel — gives fractional-inch depth adjustment, maintains close grade tolerance. A separate hydraulic ram tilts mast, balances weight of wheel forward for traveling or trailer-loading. Overall width is only 8 feet (with conveyor intact) — no dismantling for transport.

Mail to: PARSONS Company, Newton, Iowa

Send us: ☐ latest literature ☐ price information on 130 Trenchliner®

NAME ..... TITLE .....

COMPANY ..... DIV. .....

STREET .....

CITY ..... STATE .....

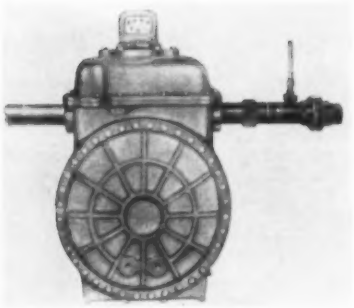
P922 GAS

PARSONS TRENCHLINERS
(A Division of Koehring Company)

GAS DIGEST

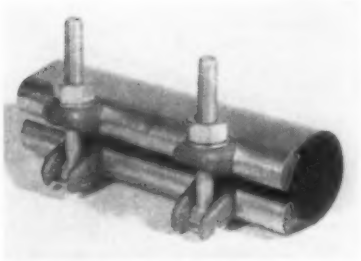
New Products and Trade Literature

For more data on any of these items use the Readers' Service Card on pages 89, 90



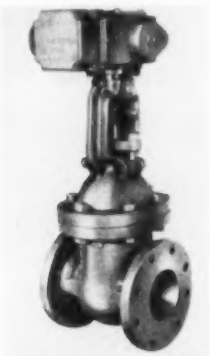
1. Critical flow prover

American Meter's new critical flow prover has maximum working pressure of 1000 psi. It is designed for field testing of positive displacement meters—with gas or air—at operating pressures of 15 psi or more. The new prover, shown here on an American 80B Ironcase meter, has five individually calibrated orifices and a thermometer. It is available in 2-in. size for gas capacities from 250 to 6000 cfh.
American Meter Co.



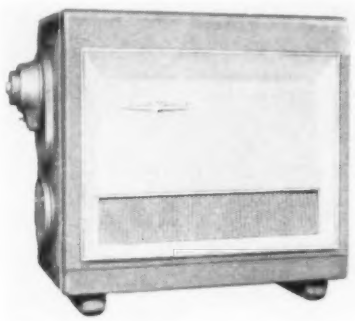
2. Pipe repair clamp

Dresser Manufacturing has a new band-type pipe repair clamp that quickly repairs leaks or breaks in steel piping. Installation of the Handiband is fast, easy and foolproof. Simply snap clamp around pipe, drop bolt head through open-slotted lug and tighten nut. Compression of large size gasket seals leak completely and permanently.
Dresser Manufacturing Div.



3. Motorized valve operator

A compact LimiTorque operator is for use on small (normally hand operated) globe and gate valves—either new or in service. Existing hand-operated valves can be motorized by removal of the handwheel and installation of the P-2 unit on the same bonnet.
Philadelphia Gear Corp.

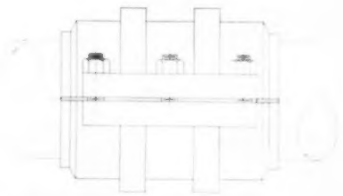


4. Home heaters

To meet demands of a style-conscious public for modern good looks in heaters, the entire 1959 Duo-Therm line of gas home heaters has been redesigned in new, modern lines and colors. Heaters with capacities from 25,000 to 66,000 Btu are offered. New finishes are basically two-tone.
Motor Wheel Corp.

5. Gas ranges

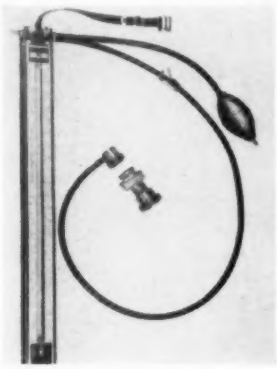
Universal gas ranges bearing the Gold Star are offered in 40-, 36-, and 30-in. models with Supreme and Custom styling. Features include air-conditioned, automatic clock-controlled super oven; obedient burner cooking; simmer-save feature; smoke-proof broiling.
Cribben & Sexton Co.



6. Pipeline repairs

Pipe Line Development Co.'s new Smith split-coupling is split longitudinally and can be used as a coupling, split sleeve, or as a pipe repair clamp. Clamping means are provided to resist endwise pull of the pipe when it is used as a coup-

ling. The split-coupling is all steel and can be welded solidly and permanently—while pipeline is in service—to become an integral part of the line.
Pipe Line Development Co.



7. Gas pressure tests

A new gauge for use by gas servicemen in checking fuel gas installation cuts time required for testing pressure, or checking for leaks, to about three minutes. The D100A Pneumatometer reads out in pounds pressure up to 10, and inches of water up to 29 in. for either pressure or vacuum on one direct reading scale.
Kuhlman Instrument Co.

8. Gas dryer

Speed Queen's 1959 Model 133 gas dryer features a stainless steel drum. Other features of the 133 include automatic ignition, In-A-Door lint trap, a foot operated door, overload protector, and a safety start button.
Speed Queen.

9. Service pipe coupler

An easy-to-install compression type coupling has been developed by Tube Turns Plastics to prevent corrosion caused by flow of stray currents at gas distribution pipeline service connections to customers' homes. The new fitting is an insulating connection of inert, nonconducting, high-impact unplasticized polyvinyl chloride for use in the service pipe between the gas main and the customer's property line.
Tube Turns Plastics.

10. Drilling holes in concrete

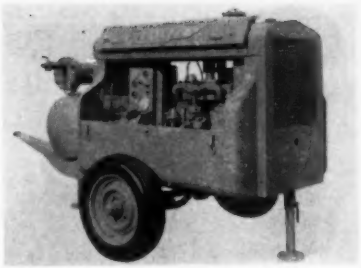
One-inch-a-minute speeds in drilling holes in concrete—regardless of the size of hole—are attained with a new drilling tool which combines rotary action with rapid jack-hammer blows. Pounding action is rated at 4000 to 7000 impulses a minute. Drill bit revolves at 650 to 1200 rpm.
Bill Jack Scientific Instrument.

11. Radiant circulators

A new 1500 series of Moore's gas heaters has been completely restyled, offering new features and improved operation. Constructed principally of cast iron, the vented radiant circulators have exterior surfaces finished in porcelain enamel with shaded mahogany color. Top-O-Matic controls are located on a panel at the top rear of the cabinet.
Locke Stove Co.

12. Mass flowrate meter

A primary element for measuring mass rate of gas flow, independent of pressure and temperature, has been announced by National Instrument Laboratories. The element is basically an annular orifice in which the area of the orifice is controlled by a sealed bellows unit whose length is a function of the temperature and pressure of the flowing gas.
National Instrument Labs.

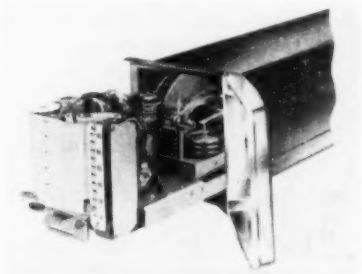


13. Rotary compressor

Jaeger's new 75-cfm rotary air compressor can run a heavy duty 80-lb paving breaker at top efficiency, maintaining 90-lb working pressure at the tool. Because of rotary design, the new compressor has fewer moving parts, is vibration free, delivers air at much cooler temperature. Precision controls prevent overrun and engine racing.
Jaeger Machine Co.

14. Built-in units

Roper has an expanded line of four built-in gas oven-broiler and 10 surface units. Surface units include two-, four-, and five-burner to fit all requirements. Two of the units are fitted with a Hudee rim, which mounts snug and flush with the countertop.
Geo. D. Roper Corp.



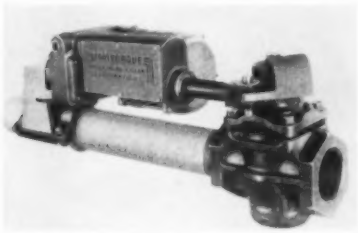
15. Pneumatic transmitters

Bristol Series 663 Dynamaster instruments are available in pneumatic transmitting models. Potentiometers, pyrometers, a-c and d-c bridges, and differential transformer receivers with pneumatic output

continuously transmit a 3-15 psig signal. The new models are especially suitable for use with Bristol's Metagraphic pneumatic instruments.
Bristol Co.

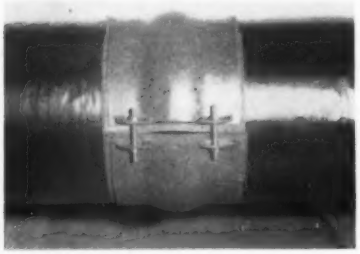
16. Spot-Turn clutch

Advances in crawler tractor maneuverability and safety are claimed with Oliver's new clutch steering. "Spot-Turn" clutch steering removes the need of foot braking for tractor guidance, enabling operator to make locked-track, partial, or wide turns with single-lever control. The mechanism is available in the all-purpose OC-4 and its companion model, the OC-46, which basically is a heavy duty $\frac{5}{8}$-yd loader.
Oliver Corp.



17. Valve operator

A new LimiTorque motorized valve operator for actuation of plug valves is announced. It is a simple, easily installed unit, built either to NEMA IV (weather-proof) or NEMA VII (explosion-proof) standards. Entire assembly of Linear operator can be adapted to plug valves while in service.
Philadelphia Gear Corp.

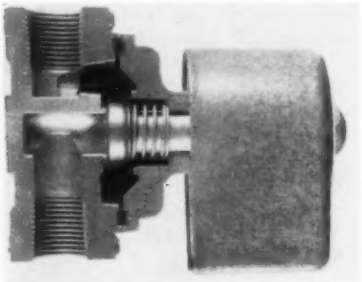


18. Casing insulator

An easy and efficient way to permanently protect carrier pipe from crossing casings is provided in Dresser's new casing insulator, Style 115. It also makes pipe installation easier. The special shape of the insulators gives added strength and rigidity and minimizes drag friction when threading carrier pipe through the casing.
Dresser Manufacturing Div.

19. Headless pipe plugs

Pipe Plugs Inc. has a new slip-proof cross slotted headless pipe plug. It is cold rolled, cold formed, Dryseal-threaded to eliminate leakers. Available in a variety of sizes, the plugs come in steel, aluminum, brass, stainless steel and everdur, and may be ordered in breather vents with porous bronze insert, or permanent Alnico magnet attached.
Pipe Plugs Inc.

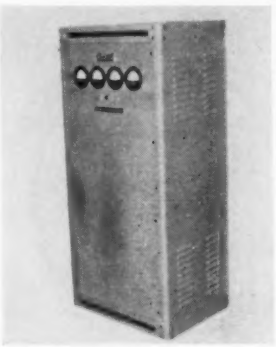


20. Solenoid valve

A new ASCO 2-way direct lift solenoid valve handles gas, steam, air, etc. Depending upon medium controlled, the new direct lift valve, with just one moving part, is suitable for uses having mainline pressure up to 40 psi.
Automatic Switch Co.

21. Dope melting kettle

A new pipeline dope melting kettle features twin agitation of the filler by a hydraulic-driven sweep and mechanically powered propeller. Crutcher - Rolfs - Cummings' new Model SPC requires less heating time in the field, eliminates the need for fuel pumps by using a pressurized fuel tank, and has a highly efficient low pressure burner. The kettle comes in 10- to 30-bbl sizes, mounted on tracks or skids.
Crutcher-Rolfs-Cummings Inc.



22. A-C power

A new Onan-developed inverter power unit has been designed to supply adequate a-c power to operate radio equipment installed in microwave stations for the brief interval required to automatically start a standby plant. While designed specifically to operate with an Onan emergency electric plant and automatic line transfer control, the unit is adaptable to existing standby equipment.
D. W. Onan & Sons Inc.

23. Trencher

Charles Machine is introducing its 1959 Model M-3 Ditch Witch trencher with many new features. These include improved digging teeth, telescoping digging boom, spring tension adjustment for digging chain, new boom positioning screw, new planetary gear reduction unit. A complete selection of digging teeth to cut trench 3, 4, 6, or 8 in. wide is offered.
Charles Machine Works

24. Gas clothes dryer

Filtration of incoming air before it is heated or comes in contact

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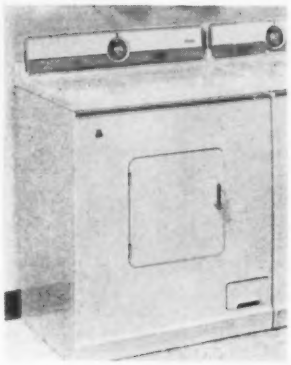


with wet clothes is featured in Maytag's new filtered air "Halo of Heat" gas clothes dryers. The new filter covers air vents on the back of the dryer. Air is filtered as a suction fan pulls room air into the cabinet, over all sides of the drum and through the circle of even heat that surrounds the entrance to the tumbler drum. A new sprinkler provides uniform, automatic dampening of clothes to prepare them for drying.
Maytag Co.

25. Plastics pipe

Western Plastics is making a strong plastics pipe extruded to AGA and Society of Plastics Industry recommendations as to weight, dimensions, and tolerances. It is suitable for either new installations or replacements.
Western Plastics Corp.

TRADE LITERATURE

26. Fan and limit controls

"The Most Complete Line" is a new 4-page booklet from White-Rodgers covering its new series of fans and limits: Hydraulic-action, Customline Ace and Customline Deuce. Information and illustrations on action, operation, and mounting each series are included. Also, specifications and special features available are listed.
White-Rodgers Co.

27. Weed control

Diamond Line Rider Formulations for simplifying, speeding up, and economizing on weed and brush control work along pipeline rights-of-way are reviewed in a factual four-page folder.
Diamond Alkali Co.

28. Plastics pipe

Republic Steel's SRK plastics pipe is covered in a recently published catalog sheet. Outlined are the advantages of Republic SRK for both new service line installations and insertion through existing corroded lines. The sheet tells how to join SRK in combination with both steel and plastics mains.
Republic Steel Corp.

29. Dry test meters

Dry test meters are discussed in Bulletin 500 from American Meter Co. It presents detailed news on a variety of dry test meters: tinned steelcase meters with totalizing indexes, charcoal test meter, tinned steelcase meters with hourly rate dial, and ironcase and aluminumcase meters with totalizing indexes.
American Meter Co.

30. Millivoltmeters

Honeywell's new 28-page Catalog C10-1 covers operating principles, specifications, features, and ordering information on non-control and control millivoltmeters. Included is information on all control models: Pyr-O-Vane, pulse Pyr-O-Vane, Protect-O-Vane, and the Pyr-O-Volt controller.
Minneapolis-Honeywell

31. Microwave

G-E's new 6 KMC line of microwave is presented in a new bulletin. Explained are the frequency bands in which the equipment may be used, dimensions of basic terminals, power consumption, and other nominal specifications. The new equipment has capacity up to 120 channels, time or frequency division multiplexing, passive bridging, plug-in units, and Klystron tubes.
General Electric

32. Gas flow

Literature is available on Foxboro's gas flow computers. The systems provide continuous, up-to-the-minute flow data for gas dispatching. Designed for gas distribution and transmission companies, the basic computing systems include units for single meter run and multiple meter run stations. Combinations provide custom designed systems for each user.
Foxboro Co.

33. Range line

A 16-page catalog from Dixie Products covers the company's 1959 line of gas ranges. Included in the colorful catalog are descriptions of Dixie's Foldaway units and free-standing ranges. Also available is a catalog on the company's Countermasters and built-in ovens.
Dixie Products Inc.

34. Gas refrigerator

Norco Inc. has published two full color brochures on its Norcold refrigerators. Described and illustrated are the new 4- and 6-cu ft gas refrigerators.
Norco Inc.

35. Pressure reducing

Bulletin J-170 describes 4- and 6-in. pilot operated pressure reducing valves with patented sliding gate and plate seats from OPW-Jordan.
OPW-Jordan

36. Line stopper

Catalog information is available on the new Ficklin-Wilantt line stopper tool. When used in conjunction with a mechanical pressure control fitting, the line stopper makes it possible to install a plug in lines operating under pressures up to 100 lb.
Stanley F. Gotter Co.

37. Pressure, vacuum gauges

A new 32-page catalog from Weksler Instrument covers dial indicating and recording pressure and vacuum gauges. Catalog 525B covers indicating gauges in 3½, 4, 6, and 8½ dial sizes in ranges from 10 in. of water to 10,000 psi.
Weksler Instrument Corp.

38. Butterfly valves

A new 4-page, 2-color catalog describes Continental lever operated, threaded end butterfly valves. Catalog 74 describes valves in sizes from 1 to 3 in. and contains an exploded view of the valve, tables of allowable pressure drops, dimensions and weights plus a description of the valve and materials of construction.
Continental Equipment Co.

people • *Continued*

from page 85

regular marketing and research functions, the new group will oversee control of sales territories, production rates, and stock levels.

GORDON SMITH is the recently named director of industry marketing for Remington Rand Univac Division, Sperry Rand Corp. He will supervise sales activities for specialized applications of Univac computers in the public utilities industry.

CHESTER L. MAY has been elected a director of Rio Grande Valley Gas Co., Brownsville, Texas. He fills the vacancy created by the death of O. P. WILSON, former board chairman. May is former senior vice president and director of Lone Star Gas Co. He retired from Lone Star in October 1958 after 40 years of service.

OLIVER E. OWEN has been named chief right-of-way engineer for San Diego (Calif.) Gas & Electric Co. He succeeds WILLIAM F. GARBER, who retired recently. Owen has been assistant chief ROW engineer since 1955.

Gordon Smith
Univac

Norman Robertson
American

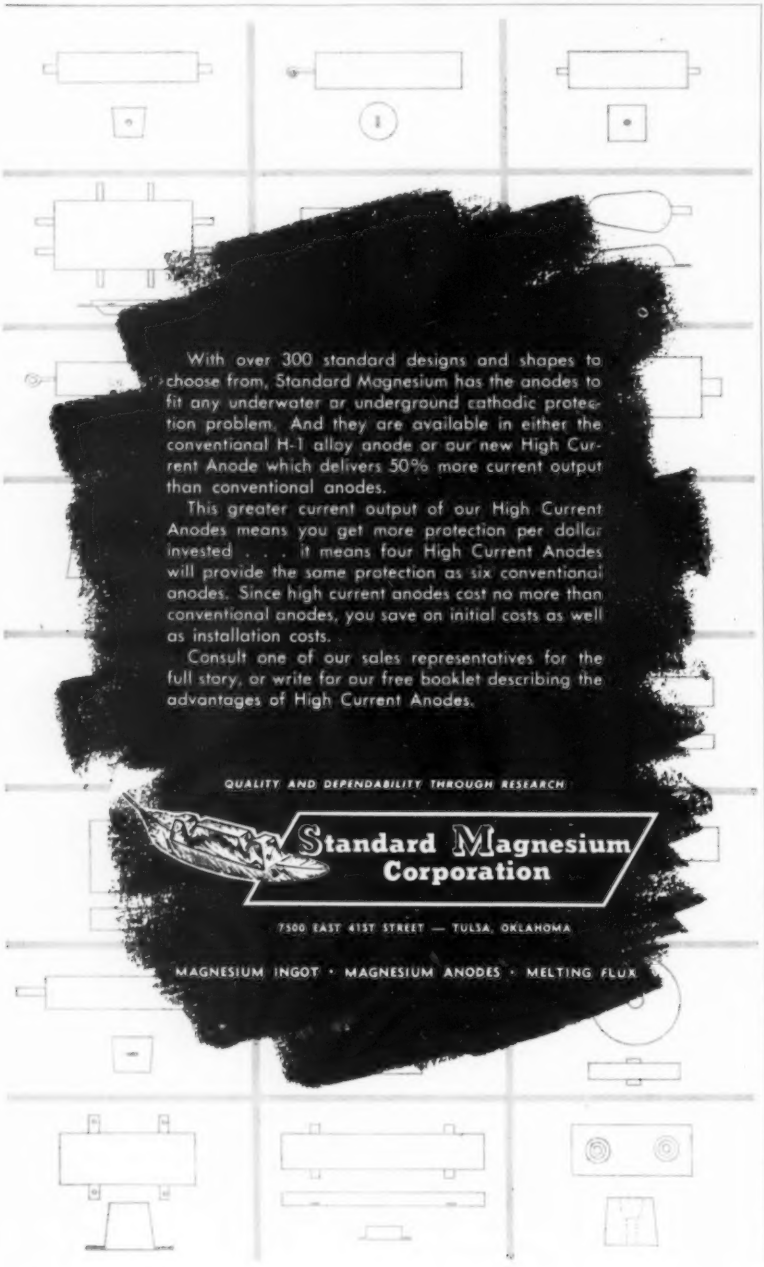
JOHN B. WILSON is executive vice president of Standard Pipeprotection Inc., St. Louis, a newly created post. Wilson, former vice president and treasurer, has been with the company since it was founded 10 years ago. LEE A. WHITNEY, vice president of Champlin Oil & Refining Co., Fort Worth, was elected to Standard Pipeprotection's board.

NORMAN ROBERTSON is heading the newly established market research department of American-Standard Air Conditioning Division. The department will work with distributors to develop marketing data for individual areas. Robertson, with the division since February 1958, has been research analyst in the marketing department.

HENRY J. RUSTON has joined Fisher Governor Co., Marshalltown, Iowa. He has had several years' experience in process instrumentation, having worked in the process plants in Sarnia, Canada. He was also active in the development of electronic equipment in Canada and the U. S. before joining Fisher.

JACK P. HARRIS, president of the Hutchinson Publishing Co. and editor and publisher of the Hutchinson News, was elected director of the Kansas Power & Light Co.

United Gas Improvement Co., Philadelphia, has made several changes in its operating department. They are: W. R. BOLLENDORF JR. to operating manager of the Lehigh Valley Gas Division, succeeding HENRY W. PARKER, who died in January; HARRY R. OTTEY succeeds Bollendorf as operating manager of Harrisburg Gas Division. JOHN S. BEARD, who has been main and service superintendent at Reading, transfers to Harrisburg as superintendent of gas supply and services. IRVING P.


With over 300 standard designs and shapes to choose from, Standard Magnesium has the anodes to fit any underwater or underground cathodic protection problem. And they are available in either the conventional H-1 alloy anode or our new High Current Anode which delivers 50% more current output than conventional anodes.
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Paul W. Rogers
Ohio Fuel

H. A. Titsch
Ohio Fuel

COOK goes from staff engineer to distribution superintendent at Harrisburg. W. L. GLESSNER, formerly customer services superintendent at Harrisburg, is staff assistant in the operating department of the company in Philadelphia. HARRY T. MAYCOCK, distribution engineer at Lancaster, moves to the Reading Gas Division as main and service superintendent. ROBERT L. YEAGER, production superintendent at Harrisburg, transfers to Lancaster County Gas Division as distribution engineer.

R. E. BURTON has been named president and general manager of the Buffalo-Springfield (Ohio) division of Koehring Co.

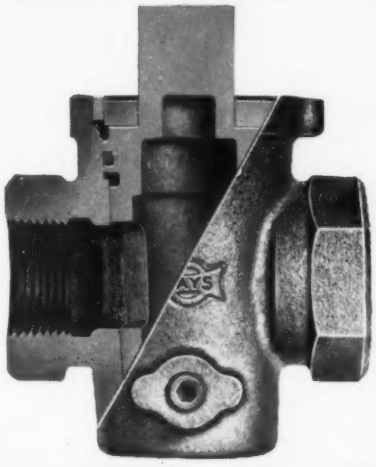
ROBERT N. WEBER heads the newly formed product planning division of White-Rodgers Co., St. Louis. The new division is charged with research and study of possible future products.

DEAN A. MCGEE, president of Kerr-McGee Oil Industries Inc., was elected to the board of directors of Oklahoma Natural Gas Co. at a recent meeting. He is filling the vacancy created by the death of Gen. WILLIAM S. KEY.

PAUL W. ROGERS, vice president and chief engineer of Ohio Fuel Gas Co., Columbus, has been elected a director of the company. At the same time, HERBERT A. TITSCH, manager of OFG's production department, was elected a vice president. Rogers, with the company for 25 years, has been chief engineer since 1953, a vice president since 1956. Titsch, who joined OFG 32 years ago, was elected an assistant vice president a year ago and was named executive assistant in the production department. On Jan. 1, he became manager of the department.

The Hartford (Conn.) Gas Co. has made several organizational changes. HOWARD R. CARLSON takes

THIS GAS STOP WILL *NOT STICK...*



- A newly designed HAYS Lubricated and Tamper-Proof Gas Stop . . .
- Stop is completely lubricated at the factory . . .
- Four Grooves in body, and Lubricant Plug provide for pressure re-lubrication . . .
- Locking Pin positively prevents tampering at top of stop . . .
- O-Ring prevents top leakage . . .
- Teflon Coated Gland Ring reduces friction between top of plug and gland ring...

Re-Lubrication does the *TRICK*

HAYS
LUBRICATED TAMPER-PROOF SAFETY GAS STOP*

- Lower initial and turning torque . . .
- Extra grade gray iron body, gas service bronze plug . . .
- Individually tested . . .
- Black or Galvanized, Flat Head or Lockwing Pattern...
- Sizes: ¾", 1", 1¼", 1½", 2", for 125 psi. W. P.

Write for Folder 121 and prices.

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REPLACES OTHER MAKES • USES REGULAR INKS
Regardless of pulsations or other causes of ink failures this Never-Dry Pen will make clean and complete records.
CHECK THESE EIGHT FEATURES
1. Always a continuous flow. No unrecorded records.
2. Holds sufficient ink for several months recording.
3. Constant weight for more accurate measurement.
4. Always clean, uniform records due to uniform flow.
5. No ink slopping or dripping in meter cases or on floor.
6. Uses regular recording inks or fast drying inks.
7. Stainless steel assures long and trouble-free service.
8. Used on practically any type of recording instrument.
Now made in 5 sizes. When ordering, specify make and type of recording instrument. Send for Bulletin 110-R2
$6.90 Each Net
Send for Quantity Prices
AMERICAN
RECORDING CHART COMPANY
7142 East Condor Street, Los Angeles 22, California
AD NO. 103
SEND FOR BULLETIN No. 110-R2

1897 1959

PIPE STOPPERS OF ALL KINDS

SAFETY GAS MAIN

STOPPER CO. INC.

GOODMAN
USED SINCE 1897
2" HANDLE & LOCKING SLEEVE
GAS MAIN STOPPER

523 Atlantic Avenue
Brooklyn 17, N. Y.
Cable Address GASTOPPER, N. Y.

over the newly created post of director of advertising and public relations. He is succeeded as general sales manager by RICHARD B. BARGER. Succeeding Barger as heating and air conditioning sales manager, and assuming charge of Hartford's new building division, is E. RALPH KRYZAK. GEORGE L. DAVIS, formerly sales representative, is now manager of the company's Manchester division. A. CHANDLER TAYLOR JR. has been named assistant to the president. HERBERT E. JOHNSON succeeds Taylor as general superintendent, operating department. ROBERT B. TURNER, purchasing agent since 1945, will now have direct supervision of Hartford Gas Co.'s stores division.

JOHN U. SIMMONS has been made sales engineer in Texas by Robertshaw-Fulton Controls Co., representing the firm's Fulton Sylphon and Bridgeport Thermostat divisions. Before his new appointment, Simmons was a development engineer in the company's Knoxville, Tenn., plant.

EDWARD R. GILMORE, well known in the gas measurement industry, has joined Reynolds Regulator Co., Anderson, Ind., as a consultant. In 1951, Gilmore joined Lancaster Meter Parts Co. as chief engineer. Before that, he was with Pittsburgh Equitable Meter Co., a division of Rockwell Manufacturing Co. While working with a Cities Service subsidiary, Gilmore, whose gas career began in 1920, developed and patented the Gilmore gas stethoscope, a means of detecting gas pipeline leaks by sound vibrations.

ROBERT L. BERWICK has been appointed PVC plastic sales engineer in A. M. Byers Co.'s southeastern division, headquartering in Atlanta. Byers also announces the assignment of RANDOLPH R. GUSTAFSON, Winter Park, Fla., as a field service engineer.

SAMUEL GREEN, senior vice president of Brooklyn (N.Y.) Union Gas Co., has retired after 47 years with the company. He joined Brooklyn Union in 1912 as a clerk and with the exception of two years during World War I, he has been continuously associated with BU's gas manufacturing activities. Rising through a succession of posts in the company's manufacturing department. Green was elected chief engi-

neer in April 1953, and senior vice president in 1957.

WILLIAM G. HICKLE has been promoted to general engineer in the plant operations department of Ohio Fuel Gas Co., Columbus. Hickle has been with OFG since 1953. For the past four years he has served as an engineer in the Columbus district.

LLOYD E. COOPER has been promoted to vice president and chief engineer of California-Pacific Utilities Co., San Francisco.

Two new directors have been added to the board of South Jersey Gas Co., Atlantic City, N. J. They are JOHN M. SEABROOK, president, chief executive officer, and a director of Seabrook Farms Co., and FRANK H. WHEATON JR., president of Wheaton Glass Co.

JAMES L. HIGDAY has been promoted to superintendent of gas operations for Kansas Power & Light Co., Topeka. Higday, with headquarters in Salina, has been superintendent of gas distribution for Kansas Power since 1957. Prior to that, he was with Public Service Co. of Colorado.

Three appointments in its domestic sales department for commercial cranes and excavators have been announced by Bucyrus-Erie Co. The men are: PAUL J. THIEL, sales administration supervisor; BYRON A. HANEY, product development manager; and FREDERICK B. SHEW, sales development manager. They all headquarter in South Milwaukee, Wis.

Several appointments have been announced by White-Rodgers Co., St. Louis. KENNETH W. HILL is sales engineer, working from the newly formed San Francisco sales area covering northern California and Nevada. H. A. TEASLEY is district manager for the newly formed Portland (Ore.) sales area, covering Oregon, Washington, Idaho, western Montana and Alaska. CHUCK MARTIN is a new White-Rodgers representative covering Colorado, Wyoming, Utah, New Mexico, west Texas, South Dakota, and eastern Montana. Covering East St. Louis, southern Illinois, northern Kentucky and south and central Indiana is JAMES L. BRECKENRIDGE.

ELO BLOMQUIST has been made manager of Walworth Co.'s Plas-

Interested in "cutting" time?
. . . Then get a
RIDGID
for faster, cleaner cuts on every job!
Five Sizes for ⅛" to 6"
Five Sizes for ⅛" to 4"
RIDGID
For General Use buy RIDGID Heavy-Duty Pipe Cutters
Factory tested for perfect tracking, here's your best cutter buy for hand use. Extra-long shank protects threads, gives fast, easy adjustment. Large handle for sure grip . . . more leverage. Strong, special malleable frame won't bend or warp. You'll also need the RIDGID Wide-Roll Cutter, that tracks perfectly at high power-drive speeds, and the RIDGID 4-Wheel Cutters, that give quick, clean cuts in tight places with only quarter turns.
For Tubing and Thin-Wall Conduit buy RIDGID Tubing Cutters
Exclusive fold-in reamer on Nos. 10, 15 and 20 protects hands and pockets . . . reams full cutter capacity. Thin-blade wheel gives quick, clean cuts. Rollers smooth tubing ready for soldering. Special RIDGID No. 315 3-Wheel Cutter gives fast cuts in hard-to-get-at places.
There's a RIDGID Cutter to save you time on every job. Call your Supply House today!
RIDGID
The Ridge Tool Company, Elyria, Ohio, U.S.A.

AMERICAN®
insulated
meter connections

permanent
molded-on design
simplifies assembly

- Insulation covers pilot flange and extends up the body—minimizes possibility of short circuits caused by moisture. No loose parts.
- Tough Nylon insulation seals tight, resists crushing. High dielectric strength eliminates electrolysis.
- Insulated meter connections are interchangeable with standard connections—accepts standard caps and washers. Reduces inventory problems.

Ask your American representative for Bulletin 308 describing all insulated and standard meter connections.

AMERICAN® METER COMPANY
INCORPORATED ESTABLISHED 1836

Executive Offices: Philadelphia 16, Pa.
Sales offices in principal cities.

Frank McCament
Ohio Fuel

C. J. Hauck
Ohio Fuel

K. W. McDowell
Coast Paint

Carl Seefeld
Coast Paint

tics Division sales. Blomquist, a sales engineer with Walworth since 1946, succeeds SIDNEY A. LEWIS, who was recently promoted to manager of technical sales service.

JACK HUDDLE has joined the sales engineering staff of Grove Valve & Regulator Co., Oakland, Calif. Huddle will headquarter in Grove's Odessa, Texas, office.

CARL J. HAUCK has been promoted to assistant manager of Ohio Fuel Gas Co.'s production department. Hauck has been general superintendent of production since 1951. Also promoted to new posts in the production department were: FRANK MCCAMENT, Mt. Vernon district superintendent of production, to general superintendent, succeeding Hauck; DONALD C. HUBBARD, formerly production engineer, to assistant general superintendent of the department; RICHARD G. COOK, storage engineer, to assistant chief geologist; and ROBERT T. PATRIDGE, engineering and map office engineer, to assistant superintendent of the engineering and map section. ALVA M. PETTY succeeds McCament as Mount Vernon district superintendent of production.

In a reorganization move, K. W. MCDOWELL has moved up from president to chairman of the board of Coast Paint & Lacquer Co., Houston. He is succeeded as president by CARL J. SEEFELD, formerly executive vice president. Other new appointments were R. M. JOHNSON as assistant to the president in charge of sales, and H. C. OWENS, assistant to the president in charge of product research and development. McDowell was one of the founders of the company in 1947 and became president in 1951. Seefeld joined the company in 1949 as a salesman, became executive vice president and general manager in 1955. Johnson, formerly vice president and technical director, joined Coast in 1951. Owens, who was vice president in charge of research and production, joined the company in 1949.

DR. E. L. EICHHORN is now manager of applied mathematics for the ElectroData Division of the Burroughs Corp., Pasadena, Calif. He joined the company in 1957 after serving as research assistant to Dr. Linus Pauling at Cal Tech.

EDWARD J. GEISE has been appointed manager of commodity sales for the Naugatuck Chemical division, United States Rubber Co. Geise, formerly assistant manager of commodity sales, replaces ALBERT W. HOLMBERG, who retired.

EDWARD V. MCASSEY has been promoted to assistant manager of the transportation department of Consolidated Edison Co. of New York. He moves up from general superintendent in charge of the equipment assignment bureau.

LAWRENCE L. GRAY has joined Consolidated Natural Gas Co.'s legal department in the New York office.

Deaths

JOSEPH L. COTTRELL, 53, gas measurement engineer and president of Flow Measurement Co., died recently. He had been president of Flow Measurement since January 1954. Prior to that, Mr. Cottrell had been with Rockwell Manufacturing Co. for 22 years.

G. F. BRUNSTON, 59, recently retired vice president of Colorado Interstate Gas Co., died in a Colorado Springs hospital in March. Mr. Brunston was taking early retirement because of ill health. He had served as vice president in charge of transmission at CIG since 1951. In 1928, Mr. Brunston was assigned as a project engineer to the construction of Interstate's original pipeline from Amarillo to Denver.

ALUMINUMCASE METERS

AL-250

- Light weight reduces shipping, handling and setting costs.
- One-piece aluminum alloy pressure die-cast body... 5 psi working pressure.
- Molded, 3-convolution Duramic diaphragms for all fuel gas services.
- Modern design and attractive appearance insures customer acceptance.

5B-225

American AL-250 Aluminumcase meter, rated at 250 cfh, operates at only 7 revolutions per cubic foot for sustained accuracy through greater power and slow-speed operation. Ideal for home heating and small commercial loads.

American 5B-225 Aluminumcase meter, rated at 225 cfh, operates at the conventional nine revolutions per cubic foot and is comparable with the standard 5B Ironcase meter... for most domestic services.

GEM *See Playhouse 90 on CBS-TV. Consult local listings for time and station.*

AMERICAN®
METER COMPANY
INCORPORATED (ESTABLISHED 1836)

AMERICAN METER CO EST 1836 MEASUREMENT ENGINEERS

GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany • Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago • Dallas • Denver • Erie • Houston • Kansas City • Los Angeles • Minneapolis New York • Omaha • Pittsburgh • San Francisco • Seattle • Tulsa • Wynnewood • IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Montreal • Regina • Vancouver

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase, and Welded Steelcase Meters • American-Westcott Orifice Meters • Instruments • Reliance Regulators • Apparatus • Valves

RUGGED and READY

Adams No. 220

Here is robust simplicity with the finest material used in each individual part: Malleable Iron lug castings ruggedly designed, 18-8 Stainless Steel band for corrosion resistance and high tensile strength, Soft Neoprene gasket for positive seal, Large Cadmium Plated steel bolt with chromate post-plate treatment. ***Quick, permanent repair.*** Simply snap on pipe, drop bolt through open-slot and tighten.

Since 1933 **Adams PIPE REPAIR PRODUCTS**

2453 MERCED AVE., SO. EL MONTE, CALIF. · 336 POPLAR ST., COLUMBIA, PENNA.

LET AUBURN TRENCHERS CUT your TRENCHING COSTS!

If you want your trenching done at less cost, and with less trouble, you want **Auburn.** This simple, time- and customer-proven machine digs where other trenchers won't even start. It has a variable speed, hydraulic drive that automatically adjusts speed to changing soil conditions, and it operates up to 800 feet per hour. **Auburn** costs less to own, requires less maintenance, seldom has any downtime, and is one-man operated. It has interchangeable digging bits and boom that let you dig from 6 to 14 inches wide, down to 6 feet deep. Special digging bits are available for rock, shale, and frozen ground.

Auburn is the world's largest producers of trenchers.

AUBURN GEAR-DRAULIC

Tractor-mounted trenchers are available for M-F Work Bulls, IH Utility, John Deere Crawler and Wheel Industrial, and Ford Tractors.

Jeep-A-Trench GEAR-DRAULIC

the original Jeep-mounted trencher, and only trencher approved by Willys Motors. Available at Jeep Dealers.

WRITE FOR COMPLETE INFORMATION and DEALER'S NAME

AUBURN MACHINE WORKS, INC. AUBURN, NEBRASKA, U.S.A.

GAS NEWS

Peoples Gas seeking air conditioning market

Peoples Gas Light & Coke Co. wants to extend gas service for air conditioning in large apartment buildings and to more industrial and commercial establishments in Chicago. In its application to the Illinois Commerce Commission, Peoples Gas said gas would be available only when not needed by year-round firm gas customers.

Peoples Gas seeks approval of a 3.4-cent per therm rate for air conditioning service in apartments of 100 or more units only during the March 15-Nov. 15 period. The rate includes municipal utility tax. This rate, Peoples said, compares favorably with any other fuel used for air conditioning.

In order to qualify for this lower rate, a customer must have air conditioning equipment with a 10 million Btu per hr capacity (equivalent to 200 boiler hp); all necessary piping and appurtenances for the supply of gas to all of the individual apartments in the building; and gas must be used for cooking in at least 90 per cent of the living units.

In a second request, Peoples Gas seeks authorization to furnish interruptible boiler fuel service to additional commercial and industrial customers. This would make gas available to those whose boiler fuel gas consuming capacity may be less than the present minimum of 50 million Btu per hr, but not less than 25 million, and who use a substantial part of the steam output from the boiler plant for air conditioning.

Piedmont buys company

Piedmont Natural Gas Co., Charlotte, N. C., has bought all outstanding capital stock of Natural Gas Co. of Western Carolina.

Western Carolina serves 1100 customers in Belton and Honea Path, located in Anderson county.

At the time of acquisition, Western Carolina was getting 1.8 Mcf of gas per day from Transcontinental Gas Pipe Line Corp.

PERFORMANCE

Peerless® GAS UNIT HEATERS

Most Advanced Heater on the Market

Peerless delivers you all the performance you need to profitably sell gas unit heaters. These quality unit heaters are expertly engineered to provide maximum performance with both low initial and operating costs. Peerless includes features that afford peak efficiency—aluminized steel heat exchanger, live rubber motor mounting, our own foundry-produced cast iron burners, scientifically designed louvers for best heat direction, motors especially manufactured for unit heater application, and a high-quality steel jacket handsomely finished in modern gray-green.

A complete line of Peerless unit heaters is available for any type requirement—fan and centrifugal blower types from 25,000 to 200,000 B.t.u. All Peerless heaters fully meet the requirements for the American Gas Association and can be used for natural, liquefied, petroleum, mixed or manufactured gases.

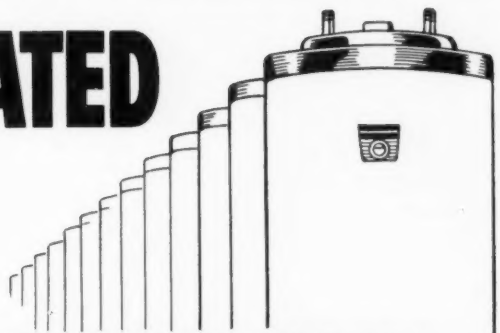
Good unit performance means profits — to you. You'll get it with Peerless.

Look for us at the Conrad Hilton, Space 176-177 at the LPGA Show in Chicago May 3-6.

GAS Peerless' *The modern fuel* THE MODERN HEATER

PEERLESS MANUFACTURING DIVISION
OF DOVER CORPORATION
LOUISVILLE 10, KENTUCKY

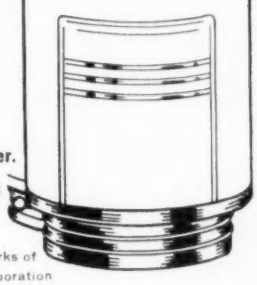
ONLY THE FINEST WATER HEATERS ARE PERFORMANCE RATED



...AND THEY'RE MADE BY AMERICAN-STANDARD

FINEST NAME IN PLUMBING AND HEATING

- With Performance Rating you easily match your customer's needs to the right size "rated" water heater.
- Performance Rating quickly makes you the water-heater expert; gives you quality and service to sell.
- Performance Rating means your customers won't run out of hot water.
- Glass-lined or galvanized steel tank; 20 to 65 gallons; full price range.



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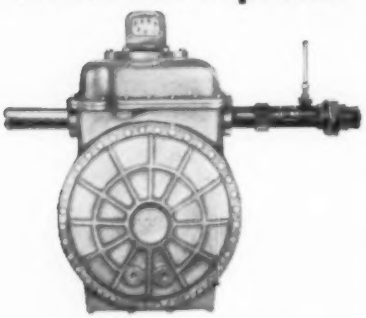
AMERICAN-Standard PRODUCTS

AMERICAN-Standard
PLUMBING AND HEATING DIVISION

new

AMERICAN®

1000 psi working pressure critical flow prover



Designed for 1000 psi maximum working pressure, the new American® Critical Flow Prover provides economical proof testing of high pressure displacement meters in the field. The portable, precision-engineered design meets the highest standards of accuracy and dependability.

Available in 2-inch size with gas capacities from 250 to 6000 cfh. Each orifice individually calibrated.

SAVES MONEY
no costly set and removal expenses.

SAVES TIME
proof tests conducted on-the-spot.

SAVES EFFORT
no handling or transporting meters to the shop.

ASK
your American representative for Bulletin 203.1 for complete details.

AMERICAN® METER COMPANY
INCORPORATED ESTABLISHED 1874
General Offices: Philadelphia 16, Pa.
Sales offices in principal cities

Industry-wide promotion program launched

Three major promotional programs are being launched by Minneapolis Honeywell Regulator Co. to boost industry-wide sales of heating and air conditioning equipment.

Included are: (1) an advertising and sales promotion program to promote the concept of two heating systems in American homes; (2) a newspaper ad campaign, scheduled for 30 key cities, to help sales of air conditioning systems during the summer's hottest days; and (3) a long-range educational program to acquaint housewives with advantages of central year-round air conditioning.

The industry-centered programs are designed to help the industry rather than the sponsor. Some $375,000 is invested in the programs.

Details of the plan were presented at meetings held in Chicago and New York in April. Making the announcements were Honeywell vice presidents K. L. Wilson, head of residential sales, and H. D. Bissell, in charge of advertising and sales promotion.

The two-heating system program is directed at Americans in the mass middle income bracket who will buy an estimated 250,000 homes this year.

Heart of the program is advertising that will appear in consumer, builder, and trade magazines.

All advertising and promotional material has been prepared in two versions—one designed for use by the warm air section of the industry and the other tailored for use in promoting two-zone hot water heating.

The consumer advertising-education program kicks off in May with two-page, two-color ads in *House Beautiful* and *Better Homes & Gardens*. The program continues in June, July, September, October and November. Home builders also will be a target of the campaign.

"Operation Heat Wave" is the newspaper air conditioning campaign. Basically, it is a local advertising and sales promotion program timed to boost sales during hot weather.

The third phase of the program —"Milady's Climate"—will be carried on indefinitely. Built around an 18-minute color movie and a 12-page consumer booklet, this program tells the story of air conditioning to housewives. The American Gas Association's air conditioning promotion committee cooperated in the development.

Honeywell's investment of more than $1 million in industry-type programs was explained by vice president Wilson: "The best way —perhaps the only sound way—to advance one's own interest in any market is to place one's primary efforts toward expanding the entire market with the hope of getting a fair share of the new or additional business."

He also pointed out that the company's motives "are not purely altruistic." "Honeywell," he said, "is strictly an accessory manufacturer; . . . So the health of our business —good or bad—is inseparably tied to that of the industry we serve . . ."

In the Western Plastics Corp. ad on p. 100 in the March issue of GAS, the address was omitted. It is Western Plastics Corp., 3110 Ruston Way, Tacoma 2, Wash.

Shooting a scene in the new movie, "Mother Knows Best." Honeywell made the film primarily for use by organized industry groups with established means of reaching large consumer groups. The informative as well as entertaining movie also will be available on a loan or sales basis to anyone in the industry.

Shown here are some of the Canadians who attended a five-day gas measurement school held in American Meter Co.'s Erie, Pa., plant. Canadian Meter Co. Ltd. sponsored the session which covered theory, operation and maintenance techniques of orifice meters, integrating devices, critical and low pressure flow proving and telemetering systems. From left: Learoy Barker, Union Gas Co.; Neil Jameison, Trans-Canada Pipe Line; Donald Smith, Kingston Public Utilities Commission; Jacques Ladouceur, Quebec Natural Gas Co.; and James King, American Meter Co. instructor.

Kansas-Nebraska presents PR and efficiency awards

Kansas Nebraska Natural Gas Co. has presented its 1958 public relations award to Virgil McMains and its efficiency award to Leonard C. Hill.

McMains is K-N's local manager at Oberlin; Hill is a cathodic engineer with the Hastings, Neb., company.

Each man received an engraved plaque and a $100 U. S. Savings Bond.

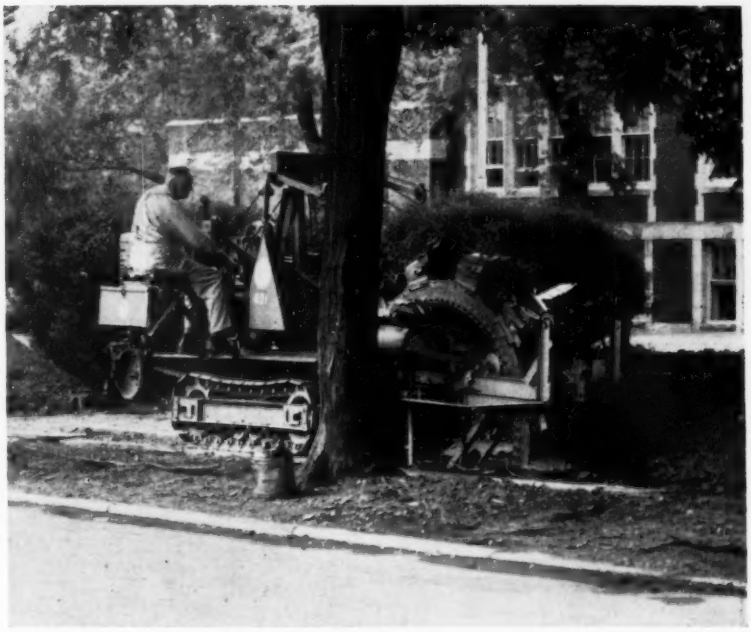
McMains, with Kansas-Nebraska since 1945, was specifically cited for his work on the planning board of a new county museum in his community. Hill, a 20-year veteran with Kansas-Nebraska, was cited for the leadership he has exercised at K-N and within the gas industry in solving corrosion problems.

UGI buys LPG company

United Gas Improvement Co., Philadelphia, has bought the physical assets and inventory of McNay Gas Corp., trading as Ward Bottle Gas, Ephrata, Pa.

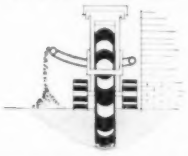
Ugite Gas Inc., which handles UGI's bottled gas business, will operate the new acquisition.

UGI president E. H. Smoker said the move "represents a logical extension of our gas business into the areas where it is not feasible at the present time to extend city gas mains. . . ."

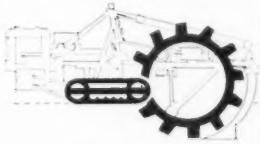


Nothing digs trench in the city like a Cleveland "Baby Digger"

PUTS TRENCH WITHIN 20 INCHES OF A PARALLEL WALL



MORE THAN 30 USABLE COMBINATIONS OF CRAWLER AND DIGGING WHEEL SPEEDS



GIVES YOU THE RIGHT COMBINATION of POWER and SPEED FOR EVERY SOIL AND JOB CONDITION

If your jobs involve city and suburban trenching, a trim maneuverable Cleveland 92 is the trencher for you. This "Baby Digger" has the practical features and advantages that give you greater, more economical production in crowded areas *...more trench...in more places...at less cost.*

- Only 4' 6" wide over its crawlers.
- Shiftable, reversible conveyor.
- Digs easily past trees, poles, fences, etc.
- Digs 10" to 20" wide...down to full 5' deep.
- Full crawler mounting...completely maneuverable...perfect balance and stability...easy on lawns, sidewalks, etc.
- Finest crawler on any trencher...long-lived...non-packing...easy-rolling...friction-free...sealed bearings...200-hour lubrication.
- Easily portable...hustles from job to job at safe, legal-limit truck speeds.
- Used on thousands of miles of trenching for gas...water...sewer...telephone...electric power...building footings...airport, highway construction.

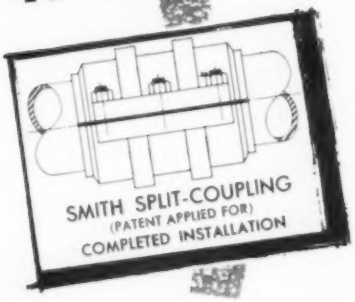
fast • accurate • clean • dependable nothing digs trench like a Cleveland

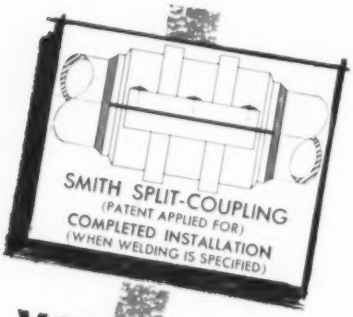
The CLEVELAND TRENCHER Co.

20100 ST. CLAIR AVE. • CLEVELAND 17, OHIO

Good Everywhere ®

IT'S NEW...





YOU NEED IT

Pipeline repairs are quick, easy with new Smith Split-Coupling used as split sleeve, repair clamp or coupling.

Field assembly consists only of placing two halves around pipe—tightening side bolts. Can be welded while pipeline is in service. Available in sizes 2" through 4".

See new Smith Split-Coupling at I. P. E. Booths 57N and 58N.

THE PIPE LINE DEVELOPMENT CO.
5700 Detroit Avenue Cleveland 2, Ohio

Equilibrium moisture content standards adopted

A correlation of the available data on the equilibrium water content of natural gases has been made. And, it is believed to be accurate enough for the needs of the industry except for unusual situations where the dew point is measured at conditions close to the critical temperature of the gas.

This correlation has been approved by the American Society for Testing Materials. It is now incorporated in Section 5c of ASTM Designation D 1142-58, "Standard Method of Test for Water Vapor Content of Gaseous Fuels by Measurement of Dew Point Temperature."

A set of 12 charts covering a range of pressures from atmospheric to 5000 psia and temperatures as tabulated in ASTM D 1142-58, Section 5c, may be purchased at $2.50 per set from the IGT, 17 W. 34th St., Chicago 16.

Copies of the standard method D 1142-58 are available from the ASTM, 1916 Race St., Philadelphia 3, for 30 cents each.

Air conditioner school set

A series of gas air conditioner training schools is being offered by Arkla Air Conditioning Corp. Maintenance, service, application engineering, and sales will be covered.

Sessions on maintenance and service of the Arkla-Servel Sun Valley and the 25-ton water chiller will be held monthly throughout the year in Evansville, Ind. The schedule is designed so those attending the 5-day Sun Valley maintenance and service school may remain in Evansville during the following week for the Water Chiller school.

Application engineering and sales classes are being held in the Little Rock, Ark., sales offices.

Rate method challenged

A bill has been introduced in the Ohio legislature to provide "a reasonable average return on capital actually expended by utility firms, instead of basing return on the cost of replacing plants at inflated present-day prices."

According to its backers, the bill would reduce charges to consumers. Under present Ohio law, the state commission uses the estimated current cost of rebuilding a company's

Find it Faster with FISHER!

M-SCOPE PIPE FINDER
only $189.50

- Greatest depth penetration
- Greatest tracing distance
- Pinpoint accuracy
- One year between battery changes
- Built-in battery testers
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Built for rugged field use: Transistorized circuits, compact fiberglass case.

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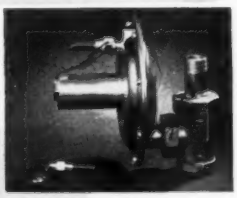
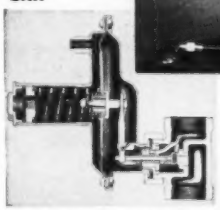
FISHER Research Lab., Inc.
Dept. G-3, Palo Alto, Calif.

UNIVERSAL
GAS SERVICE REGULATORS FOR CONVERSION OR PRESSURE ELEVATION

A REGULATOR, BREATHER VENT AND CATHODIC INSULATOR IN ONE PACKAGED UNIT





U. S. Patent No. 2,577,480. Other Patents Pending.

TYPE 51-R FOR EVERY INSTALLATION

EXCLUSIVE FEATURES NOT FOUND ELSEWHERE!

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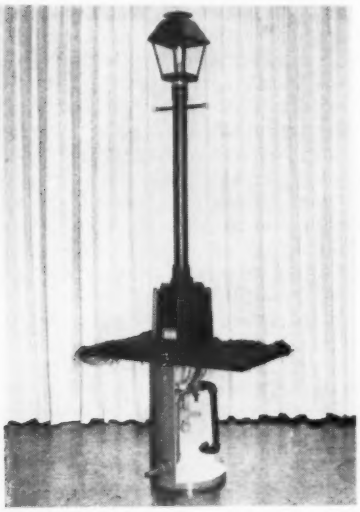
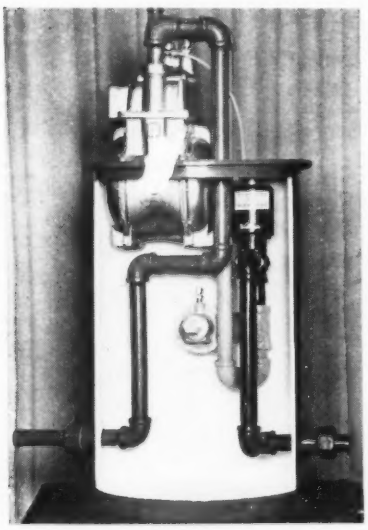
DALLAS 20, TEXAS

property in assessing its capital investment.

With proposed legislation, the commission could use almost any means it saw fit to estimate the value of a utility's property.



Rochester (N.Y.) Gas & Electric Corp. has put a residential gas meter at the base of an exterior gas light post. Above view shows the meter and pressure regulator installation, mostly underground and in water tight housing at base of gas lamp. Window at base of lamp permits reading meter dial. The inside view (below) shows how meter and other equipment can fit into base of gas lamp. Included is a shut-off valve and a primary pressure reducer that cuts inlet pressure from a level in excess of 50 psi to about 5. The meter incorporates the second stage of regulation, reducing pressure to the utilization level of about 6 in. wc. Connection to gas light is off the reducing tee shown at top of meter.



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The **Lancaster Leather Diaphragms** you order now make possible the most accurate gas measurement ever from Sprague 1-A meters. Larger size leather diaphragms for Sprague meters are also being produced by the same new Lancaster process.

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Construction crew at Laclede Gas Company, St. Louis, is shown lowering in a section of coated and wrapped steel main in the Kirkwood area of St. Louis. Note two Sooner Boomer units are being used, assisted by a crane. For over 2 years, Laclede Gas has made good use of their Sooner Boomer units, keeping them busy throughout the year.

Highly maneuverable, the Sooner Boomer operates at road speeds up to 27 MPH!

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Gaslite BY ARKLA

Write ARKLA, Gaslite Division, Dept. A
Shannon Building,
Little Rock, Arkansas

Bryant Manufacturing unveils air conditioner

Bryant Manufacturing Co. introduced its new gas-fired air conditioner recently in Indianapolis.

Samuel F. Shawhan, president and general manager, said "introduction of the residential gas-fired air conditioner . . . culminates over 10 years of research on gas-fired residential cooling. Consistent with the research policy of Carrier Corp., of which Bryant is an operating division, every conceivable design which uses gas as the energy source was evaluated thoroughly before the decision was reached on a design approach for the residential market. This included investigation of gas-engine driven compressors, steam jet units, absorption and adsorption cycles, and turbine-driven centrifugal compressors."

The new unit is entirely air-cooled, may be installed outdoors, is quiet and automatic in operation, and is practical for add-on application in conjunction with existing furnaces, Mr. Shawhan said.

Following completion of the initial research phases and successful performance of prototypes in residential installations, Bryant produced 69 "hand made" units. These were operated in residences in various parts of the country served by 42 different gas companies.

The Bryant system consists of an air-cooled absorption refrigeration machine designed for outside installation. It produces chilled water and is equipped with a pump which circulates the chilled water through the second piece of equipment, a coil package within the home mounted in the furnace duct system. The equipment needs no cooling tower or water supply. The motors for the fan and circulating pump operate on ordinary 115-v house wiring.

New utility board proposed in Ohio

A bill to cut the powers of the PUC has been introduced in the Ohio legislature. All administrative power of the commission would go to a new director of public utilities. He would be a member of the governor's cabinet.

Ohio Governor DiSalle said this director would represent "what is best in the public interest" in matters concerning public utilities.

"He would be neither pro-utility nor anti-utility," he said.

Filings now made to the PUC would go to the new department, which would have the power to issue the same orders as the PUC. The present commission would become a review board to oversee actions of the department. Appeals could be taken to the board. And, if the board overruled the director, he could appeal its decision to the courts. The board would continue to have three members.

The governor said putting the responsibility for utility affairs in the hands of a director responsible to the governor would help the state coordinate its efforts in economic development.

Air conditioners going to college

Arkla All-Year gas air conditioning units are being made available to engineering colleges and universities for instruction purposes at a special reduced cost.

W. G. Wepfer, Arkla general sales manager, said the program will enable colleges to instruct graduating engineers in the operation of single-coil year-round gas units, with particular emphasis on the heat absorption principle.

The program is designed to permit local gas companies to work with Arkla in making the units available to colleges at little or no cost.

Food experts cooked with gas at the School for Brides and Bridegrooms sponsored by the New York *Herald Tribune*. Using demonstration table with built-in gas burners loaned by GAMA, Miss Esther Foley, food editor of McFadden Publications, prepared a quick beef stew.

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Malleable Couplings

Normac Insulating Malleable Couplings and fittings are available with polyethylene inserts and semi-insulating gaskets or full insulating rubber gaskets.

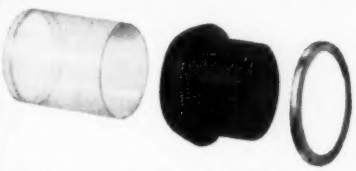
Insulating Couplings AND Fittings

Malleable Service Ell

The insulating principle depicted above is carried out in all Normac Ells and Tees.

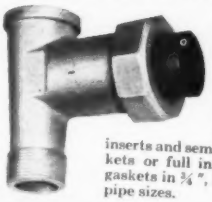
NORTON McMURRAY has specialized for 20 years in the development and production of products solely for the Gas Industry. Whether your plans include modernization, or new, expanded facilities, Normac Gas Distribution Equipment will serve you well.

Insulating Gaskets



The Normac insulating principle incorporates an efficient combination of a polyethylene sleeve and a semi-insulating gasket or full rubber gasket and retainer ring.

Brass Fittings



Normac insulating Brass compression end Tees, Ells and all compression end fittings are available with polyethylene inserts and semi-insulating gaskets or full insulating rubber gaskets in ¾", 1" and 1¼" iron pipe sizes.

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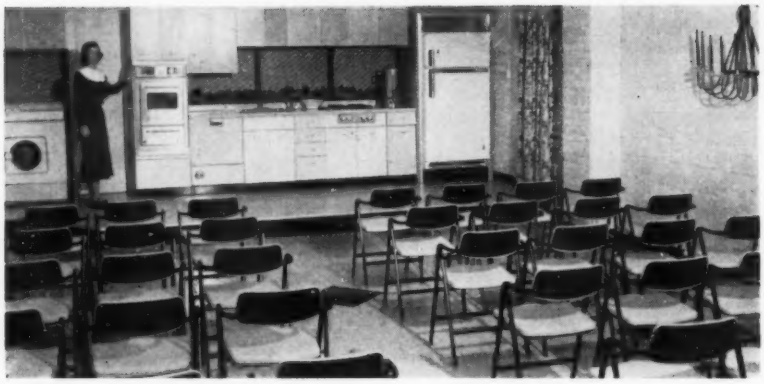

Hi-capacity water heaters replace oil-fired boilers

William A. Coger, commercial sales representative for Washington Natural Gas Co., Seattle, solved a difficult engineering problem and won top honors in a national sales contest sponsored by A. O. Smith Co.

Unused space in the Franklin, Ind., office of Indiana Gas & Water Co. has been converted into a meeting room to serve both the company and the community. The room is available to women's groups for meetings and social gatherings, without charge, as a public service. It is equipped with an RCA-Whirlpool all-gas kitchen, where the women may prepare luncheons or refreshments. In the first month the room was used by 15 different organizations.

Coger had to switch to natural gas—as efficiently as possible—the base load from two existing 175-hp oil-fired boilers which furnish space heating and hot water to a 360-unit apartment building in Seattle. According to the owners, the boiler system is the largest west of the Mississippi.

Because of space limitations, the additional units had to be gas-fired, 420,000 Btu high-capacity commercial water heaters.

Coger solved it by teaming 10 A. O. Smith 718 Burkay 420,000 Btu water heaters in a series of two—paralleled and controlled—so that the load passed on automatically as each water heater nears capacity. Originally designed to supplement the oil-fired boilers, the new heaters have been in continuous operation since the installation, carrying the full space-heating and water-heating load and using the oil-fired boilers for short peaks.

The new concept may alter apartment house design materially since the high capacity gas water heaters occupy only about 15 per cent of the space required by the almost 3-story tall 175-hp units. The savings would add a 4- to 6-car stall in the basement garage plus space for one or two apartments on the first and second floors.

GAS newsnotes—page 174

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THE PROBLEM:

Provide storage for 72,000 barrels of cement for a construction job in central Quebec, 200 miles north of nearest rail point. Storage tanks previously used on similar projects were made of wood, which were so difficult to erect and dismantle that they were abandoned when the job was completed, with a total loss of tanks.

THE SOLUTION:

Three 54'-11¾" diameter x 40'-3½" high Bolted Steel Storage Tanks specially designed by National's Engineering Department.

1. The component parts of these tanks were small enough that they were easily shipped to this remote area.
2. The largest shell and deck elements were easily handled by two men.
3. Erection was completed in a very few days.
4. National's anchor base ring provides a positive moisture seal between the concrete foundation and the steel tank shell against high water or drifting snow.
5. The bolted joints are water tight and air tight.
6. The tanks are designed to be quickly and easily dismantled, shipped to a new construction site and re-erected.

   At the same site, this customer is using several smaller National Bolted Steel Storage Tanks to store fuel oil and gasoline.

National Bolted Steel Tanks are used for storage of oil, water, grain, feed, sand, drilling mud, gravel and many other bulk materials.

Let National's Experience Help You Solve Your Storage Problems

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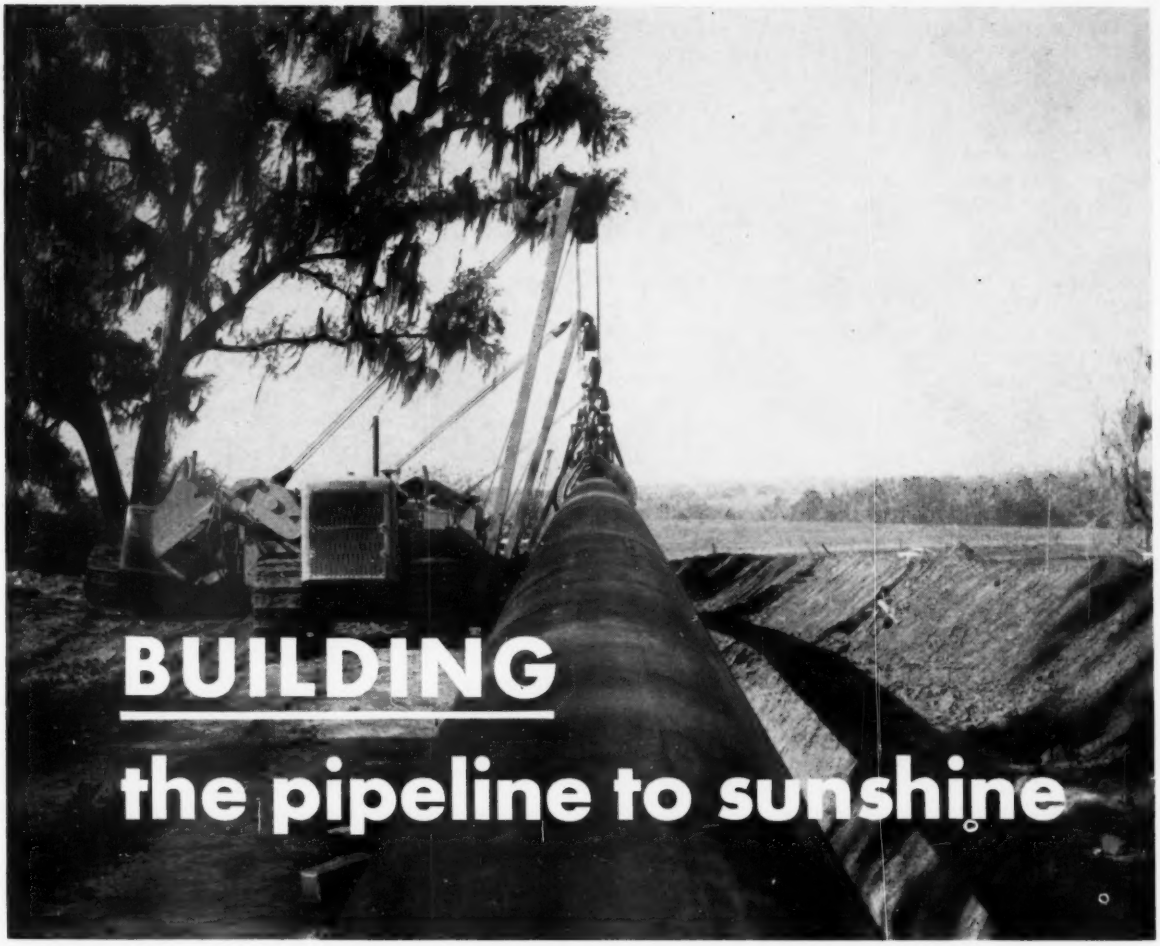


BUILDING the pipeline to sunshine

By J. FRED EBDON • Editor

GAS staff report

THE purpose of both the Coastal Transmission and Houston Texas Gas segments of the pipeline system is to pick up natural gas in producing areas of the Texas-Louisiana Gulf Coast and move it to Florida for delivery. This purpose is being closely followed as there are no deliveries from the line outside of Florida and no farm taps on the mainline.

The Initial Pipeline System is designed to deliver a daily average of 282 MMcf with a maximum day delivery of 286 MMcf—with measurement at 14.65 psia and 60 degrees F and based on 1000 Btu per cu ft natural gas (dry basis), although the estimated actual calorific value will approach 1050 Btu per cu ft. The system is designed for expansion to deliver 411 MMcf on an average day with a maximum daily delivery of about 418 MMcf.

As initially constructed and operated, the mainline will total 1476.5 miles of 12-in. through 24-in. OD steel pipe. Some 1087.9 miles of supply and delivery laterals from 2.5-in. nominal diam. through 18-in. OD will be constructed to make an approximate total of 2564.4 miles of pipe in the transmission system.

Eight modern compressor stations with an aggregate of 40,500 hp will move the gas initially. Four stations will be located along Coastal's part and an equal number in Houston's part of the project.

The total cost of the initial project will be $163,756,000; another $40,553,000 is contemplated for the planned expansion. After this expansion is carried out, it is estimated that the over-all cost will have been $204,329,300. Details of the cost are shown on *Table 1.*

The pipeline that will bring natural gas to the major centers of Florida's population describes a line basically parallel with the Gulf of Mexico's coastline. It starts in the citrus belt of Texas' lower Rio Grande valley at McAllen—right down on the USA-Mexico international boundary.

The line skirts Corpus Christi; slides south of Houston by cutting through Galveston Bay; and crosses the Sabine River east of Beaumont, Texas, to enter Louisiana. Both the Atchafalaya (a river respected by pipeliners) and Mississippi Rivers are crossed before the big conduit nudges Baton Rouge. From there it hikes across northern Louisiana to Bogalusa and across the Pearl River into the state of Mississippi. That state is kind to the pipeline and only disturbs it with a crossing of the Pascagoula River before the project quits Mississippi for Alabama.

A gentle northward slant is taken to seek a narrow, propitious site to traverse the Mobile River. Heading southward again the sunshine-bound line enters Florida just about where the Escambia River also cuts the Alabama-Florida state-line.

The colorful (in name, anyway) Choctawatchee, Apalachicola, and Ochlockonee Rivers are crossed before the mainline bends around Tallahassee and heads sharply south through the heart of Florida to Cutler —just south of Miami.

• Gas sales

Of the initial daily average delivery through the Coastal-Houston pipeline system, approximating 282 MMcf, some 150 MMcf per day will be transportation gas. This gas is purchased by Florida Power Corp. and Florida Power & Light Co. from gas producers at the wellheads. The electric power companies pay Houston Texas Gas & Oil Corp. a contracted amount per Mcf moved and Houston Texas Gas pays Coastal Transmission a cost-of-service amount-per-unit moved through that part of the mainline. This transportation service is the "backbone" of the project.

Transportation gas is on a firm basis. The power companies have to take-or-pay for 90 per cent of the average daily contract volume—150 MMcf. There are other details applicable to these contracts. The transportation rate is 13.5 cents per Mcf for Florida Power and 17.5 cents per Mcf for Florida Power & Light. It will account for about 53 per cent of the initial delivery.

Firm gas sales for resale carry a rate of 55 cents per Mcf. Firm resale gas will make up about 10 per cent of the pipeline's initial capacity and will grow to about 20 per cent in the third year of natural gas operation.

Preferred interruptible sales for resale is at a rate of 33 cents per Mcf. This gas goes to distributors on a preferred interruptible basis for resale to commercial or industrial customers. These sales will average about 8 per cent of the initial pipeline system deliveries.

Text continues on page 115. The following pictures take you on a tour of the Galveston Bay marine operation.

TABLE I. COST OF INITIAL PROJECT

	INITIAL PIPELINE SYSTEM			EXPANDED PIPELINE SYSTEM		
	Coastal	*282 MMcfd Houston*	*Total*	*Coastal*	*411 MMcfd Houston*	*Total*
Pipeline	$47,093,000	$81,747,300	$128,840,000	$3,891,000	$2,039,000	$5,930,000
Compressor Stations	4,529,000	6,720,000	11,249,000	9,444,000	18,600,000	28,044,000
Meter and Regulator Stations	140,000	2,000,000	2,140,000	99,000	65,000	164,000
Communications	Leased	Leased	Leased	—	—	—
Tools and Work Equipment	140,000	315,000	455,000	—	110,000	110,000
Employee Housing	—	160,000	160,000	—	240,000	240,000
Office Equipment	100,000	193,000	293,000	12,000	—	12,000
Transportation Equipment	180,000	215,700	395,700	16,000	—	16,000
Cathodic Protection	160,000	245,000	405,000	—	—	—
Land in Fee	60,000	135,000	195,000	96,000	80,000	176,000
Dehydration Facilities	195,000	—	195,000	91,000	—	91,000
Direct Costs	$52,597,000	$91,731,000	$144,328,000	$13,649,000	$21,134,000	$34,783,000
Undistributed Costs	$ 6,203,000	$10,635,000	$16,838,000	$1,854,000	$ 3,179,000	$ 5,033,000
Total Plant Costs	$58,800,000	$102,366,000	$161,166,000	$15,503,000	$24,313,000	$39,816,000
Other Costs	$ 976,000	$ 1,614,300	$ 2,590,000	$ 292,000	$ 445,000	$ 737,000
Project Cost	$59,776,000	$103,980,300	$163,756,300	$15,795,000	$24,758,000	$40,553,000
Expansion Cost	—	—	$40,553,000	—	—	—
Overall Cost	—	—	$204,329,300	—	—	—

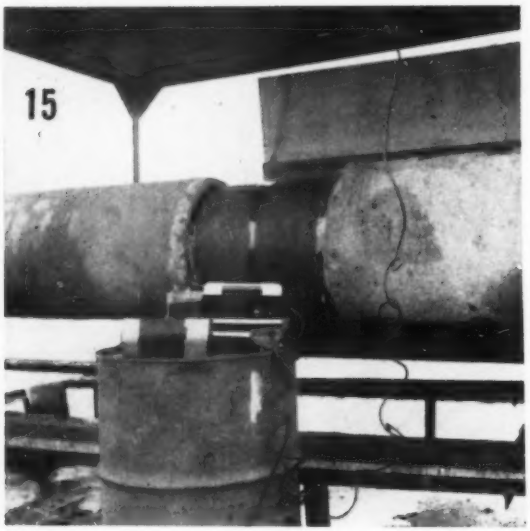
1—Pipe coated with conventional coal-tar based enamel and pipeline felt is lifted from a pipeyard stockpile to the concrete coating unit.

2—Concrete coating unit winds on reinforcing wire and shoots wet aggregate on pipe over conventional coating. A joint of this 24-in. OD, 0.500-in. WT pipe weighs 5000 lb bare; 14,000 lb per joint after concreting.

3—Moving from the pipe yard to Galveston Bay near Texas City, Texas, the spoil piles from the dredged pipeline "trench" (actually channel) are seen. Pipe had to be laid 12 ft below the 55-ft deep Houston Ship Channel, but water was considerably shallower on most of the bay crossing.

4—Crew boat approaching the Brown & Root lay barge. Concrete pipe was supplied to lay barge by supply barges. Tugs helped hold and move lay barge as the pipeline was laid.

5—View of the 410-ft long integrated pipe-laying barge. "Feet" (steel beams on end to the left) held and walked barge along as pipeline was made. They were mechanically raised and lowered as needed. Complete "spread" worked on the craft.



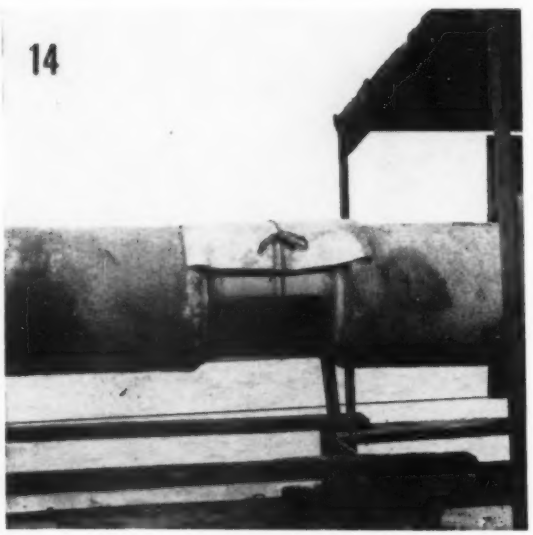
6—Concrete coated joint is swung from pipe storage to the head of the pipeline production line. The coating costs about $5 per foot.

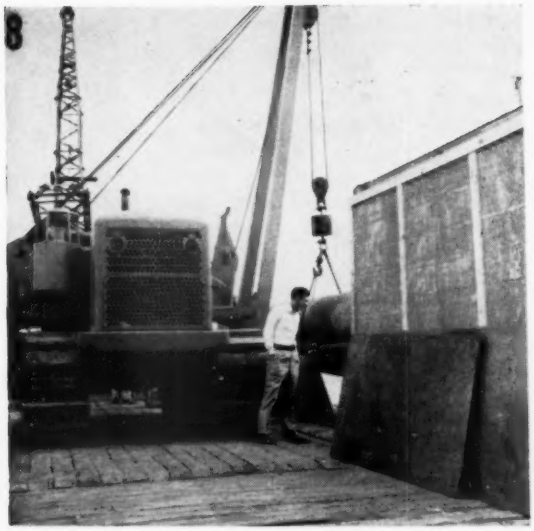
7—As one joint goes into alignment and stringer-bead welding shack, the next joint sits ready. Lay barge worked 24 hours per day (weather permitting) and had radio communications with ships and shore.

8—Big Allis-Chalmers tractor with pipe layer cradles 14,000-lb joint of 24-in. OD pipe. Note that tractor has cleats blocked with wood to prevent tearing up the lay-barge deck.

9—Stringer bead welders work in plywood shack to protect them and their work from typically (for January) cold windy drizzle of the Gulf Coast. Shackdoors have aperture for pipe so work can progress with doors completely closed.

10—Pipe was supported between hot-pass and firing line welders by this specially designed roller cradle. Spreadmen on such marine projects draw about the top wages in the pipeline construction field.





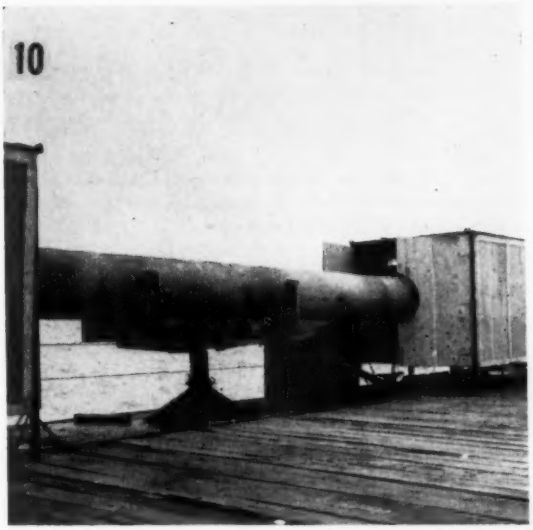
11—In their little plywood shack, firing line welders run on filler beads. Welding on such projects has to be top performance as costs of laying and any subsequent repairs are high.

12—Each weld is X-rayed on long water jobs such as the Galveston Bay crossing. Shilstone Testing Laboratories had the X-raying for several water crossings on the Coastal Transmission project.

13—Field joints are coated and wrapped with coal tar primer and enamel. Roof and wind screen protect the coating job from rain and salt-water spray.

14—Stainless steel cap protects fresh priming and enamel coats as field joints move from coating station to wrapping shed. There, coal-tar saturated asbestos pipeline felt is put on with coal-tar enamel and a rock shield bent on with steel strapping.

15—The field joint coating and wrapping system is proved out on this barge-mounted station where the jeep is run. Careful handwork was producing few holidays.



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16—After conventional treatment of field joints, they have to be concrete coated. At the windbreak shown, reinforcement wiremesh is formed over joint, and pipe travels to the concrete coating station on this roller support.

17—Sheet steel sleeve is peeled back while spreadmen pour on concrete aggregate to finish out field joint. Reinforcing sleeve has been built on at preceding station.

18—Concrete is hand puddled to assure high density and complete coverage before setting up.

19—Finished coated and wrapped, and concrete coated field joint is made with sheet steel sleeve bolted on to mold setting concrete to the periphery of pipe. Sheeting is held in place with metal straps.

20—Finished pipeline is put to bed in 12 ft of water in Galveston Bay. On deeper stretches, pontoons were needed but here the angle is not severe.

18

20

19

Direct preferred interruptible sales for use will be gas pegged at 33 cents per Mcf. This is gas sold direct from Houston Texas' pipeline to industrial customers for end use. About 12 per cent of the initial pipeline average capacity will be sold in this class of delivery.

Direct primary interruptible sales for use will be made between Houston Texas Gas and industries and municipalities for electric power plant use. The price will be 30.1 cents per Mcf for this gas which constitutes about 44 per cent of the initial annual pipeline deliveries.

• Gas supply

Resale gas for the Florida pipeline project will come from over 37 separate producing fields in the Gulf Coast areas of Texas and Louisiana. Coastal has upwards of 50 20-year contracts with various producers. Initially, the major suppliers of natural gas to Coastal will be Gulf Oil Corp., Shell Oil Co., and Superior Oil Co.—these three producers will supply about 70 per cent of the gas sold for resale. Coastal Transmission will be Houston Texas Gas' only supplier of resale gas and the two companies have an additional contract covering gas for compressor station fuel.

The field supply of transportation gas is, of course, covered by contracts among the two power companies and several natural gas producers. Florida Power Corp. will purchase from Pure Oil Co. and Sun Oil Co. in the south Louisiana production areas, while Florida Power & Light Co. will buy from Sun Oil, Magnolia Petroleum Co., and La Gloria Oil & Gas Co. in southern Texas.

Coastal's certificated direct purchase contracts for resale gas are backed by dedicated reserves in excess of 838 billion cu ft. There is another 20 billion cu ft of uncommitted reserve in several of the fields wherein Coastal has gas purchase contracts. They will probably be available to Coastal due to the proximity of that company's lines.

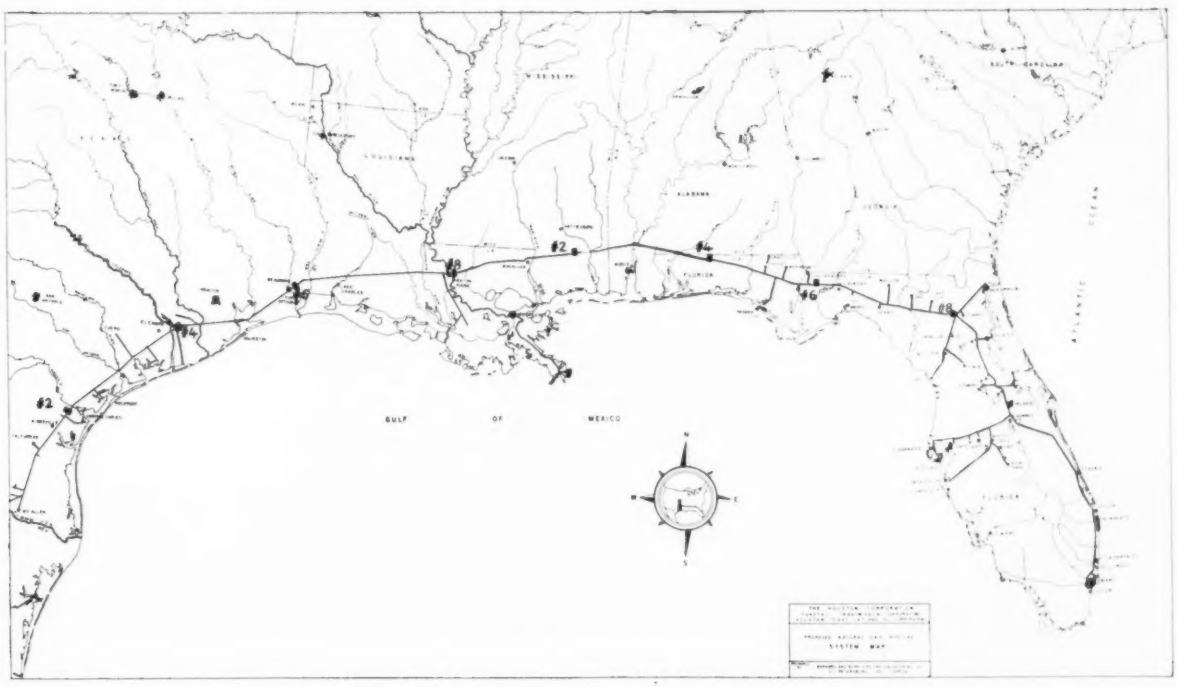
In addition to these proved reserves there is a probable reserve in the Kain field of approximately 29 billion cu ft. Thus, Coastal has a potential gas supply of 887.7 billion, or a 15-year supply based on the proposed production rate of 135.7 MMcf per day.

It should be noted that Coastal's mainline passes through the Gulf Coast areas of both Texas and Louisiana. This Gulf Coast region contains the major portion of the proved reserves in the nation. Also, it is an area of active, continuing exploration and development, both onshore and offshore. Several of the fields from which Coastal will take gas have been further developed so that proved reserves can be adjusted upward.

Coastal Transmission's gas supply department in Houston has been active all through the construction phase in contracting for additional gas supply. These activities tie-in with the proposed expansion of the project's initial pipeline system from a daily average delivery of 282 MMcf to 411 MMcf in the future. FPC filings for an expansion program will likely be forthcoming before gas is first delivered (before June 1, 1959).

THE CONSTRUCTION PHASE

THOUGH both Coastal Transmission and Houston Texas Gas & Oil have the same parent company, the



Route of the Coastal-Houston line from Texas to Florida.

construction of their respective segments of the project's mainline has been handled with considerable individuality. However, both companies have well-designed projects that are moving ahead better than expected and both expect to lay-out in plenty of time for the deadline of June 1, 1959.

• Coastal's construction

Coastal's part of the project, originating at McAllen, Texas and extending to Baton Rouge, La., follows a virtual pipeline alley. This entire Gulf coastal area is interlaced with various natural gas company mainlines, gathering systems, and laterals. You might say that there is nothing new about a company like Coastal putting in a system in this country—it has all been pipelined before. This is true, but there are still problems in logistics and construction when you build 94.6 miles of 12-in.; 151.2 miles of 20-in.; 62.7 miles of 22-in.; and 250.7 miles of 24-in. into 559.2 miles of mainline—plus another 414.1 miles of assorted 2.5- to 14-in. lateral feeds.

From its Houston headquarters, Coastal Transmission is doing its own right-of-way acquisition; design and engineering; and supervision and inspection of construction. As had been the case with most long-line gas projects in recent years, one of the most difficult phases has been right-of-way acquisition. It can be gotten, but they make you work for it these days.

Coastal's lines takes the rivers submerged. Major crossings are under the Nueces, Guadalupe, Lavaca, Colorado, Brazos, Neches, and Sabine in Texas. In Louisiana there are rivers everywhere but the Calcasieu, the very tricky Atchafalaya and the Mississippi are outstanding as pipeline obstacles. However, they have all been crossed before and will be again. But building under these waterways is still not the easiest work man can do.

Crossing pipe is coated with coal-tar based primer and enamel on Coastal's segment of the project. A double felt wrap with fiber-glass follows. Concrete coating has been used for the crossings where needed and in swampy sections of east Texas and Louisiana.

One of the most interesting construction feats on the Coastal Transmission line was laying 11.1 miles of 24-in. pipe across Galveston Bay. This was a lay-barge job that was put in without too much incident in late January.

The pipe involved in this long open-water job was 24-in. OD with a 0.500-in. wall thickness. It was first coated and wrapped with pipeline enamel and felt, then Rossen-Richards Co. applied concrete coating. The concrete coating equipment was set up at the Sid E. Culbertson pipe yard in Houston. There 62,000 ft was concrete coated for the Galveston Bay job and another 2200 ft for Buddy Sherrod, Inc. to drop in at the Neches River crossing.

• Coating system

The protective coating system applied to the Coastal Transmission segment of the pipeline that will bring natural gas to all of Florida is completely different from that of Houston Texas Gas & Oil. Coastal chose a coal tar enamel coating system for its entire project. Primers and enamels were supplied by Koppers Co., Pittsburgh Coke & Chemical Co., and Reilly Tar & Chemical Co. Glass is used on the rivers with a double wrap of coal-tar saturated pipeline felt. And, of course, considerable concrete coating was applied for the bay, swamps and rivers.

• Other features

The Coastal Transmission part of the pipeline will be powered by four compressor stations with a total of 16,500 hp. They are at basically sea-level locations.

For the initial pipeline system, the compressor facilities will be Station 2 on the table-top flatlands to the southwest of Corpus Christi; Station 4 will be nestled in the pecan and oak covered country near Bay City, Texas; Station 6 is about 15 ft above sea level on the edge of Neches-river swampland just east of Beaumont; and Station 8 is on the east side of the Mississippi river north of Baton Rouge.

Station 2 will have one Cooper-Bessemer GMWA 10-cylinder unit rated at 2500 hp. Station 4 and 6 will each have two C-B GMWA 8-cylinder jobs developing 2000 hp. Station 8 will have three 2000-hp Cooper-Bessemer GMWA-8's.

These are integral engine-compressor V-angle units that make a neat, compact package. The engines are two-cycle, and are scavenged with a gear-driven centrifugal blower.

The block valves on the Coastal Transmission line will be Grove Seal-O-Ring gate valves in full size with the mainline which telescopes from 12-in. to 20-in. to 22-in. and through to 24-in. This valve in the block assemblies will give full opening for line cleaning pigs along Coastal's route which picks up all of the gas production.

As can be seen from these few details, the Coastal project does not differ very much from the many pipelines that traverse the same country and do approximately the same job. Most of these projects have been well covered in the past literature, so there would be little profit in reviewing the details further. However, this should not take credit from the people who put together and are building this pipeline. They are dynamic people who know how to build a pipeline. They will have their project ready to meter mainline flow to Houston Texas Gas at Baton Rouge when the latter calls for it.

• Houston's construction phase

The Houston Texas Gas & Oil Corp.'s pipeline project is also pretty straight vanilla pipelining as it leaves the master measurement point near Baton Rouge where Coastal delivers to it. Louisiana on the eastern side of the Mississippi is much like southern Texas and Louisiana on the western approach to the Mississippi in that it is pretty well laced with natural gas pipelines. And, the Florida-headed project keeps its feet pretty dry in Louisiana where it is not hard to get a transmission system very wet.

Naturally there were some swamps such as the gravel-laced Amite river bottom as the project built eastward from Baton Rouge. But then it moves into heavy pine forest which is not too rough. The main obstacles are marshes or swamps that require a push. A 9500-ft pipe push in the Boquechitto river bottom is

Getting out of Louisiana, rolling pine forests had to be built through. While going over the roll things were smooth, but at nearly every drop down a marsh was hit. In fact, Houston Texas Gas needed a lot more Wait-coated pipe and river clamps in Louisiana, Mississippi, and Alabama than had been originally planned for. Rip-rapping was in vogue for heavy equipment; lighter equipment such as pipeliners usually walked the pipe through the marshes.

IN THE NORTHERN PART OF THE FLORIDA PENINSULA

it wasn't all bad . . .

1—Here a Cleveland 320 makes ditch handily and side cutters shape the trench to prevent the sandy soil from caving.

2 and 3—Looking back at a tape wrapping machine coming down the pipeline and then forward where it will be in a very few minutes, one sees the good side of Florida piping.

4—Florida ground can be spongy. However, here it is offering good flotation for welders' rig near Perry.

. . . and it wasn't all good

5 and 6—Cutting in back of tung orchards (from whence comes tung oil) and at times through them, Houston's line hits some swamps where line has to be pushed in. The technique is to have one tractor pull the weld-up string with cable while two or more push the string in fast to prevent the pipe from sucking in. Once this happens, it is awfully hard to break loose.

typical. Over 300 sets of river weights are needed to hold this one in place.

The photos on page 117 tell a pretty complete story until the project gets into Florida.

Through Mississippi and Alabama the spreads made good progress and did not run into too many spectacular difficulties. There was a dual 18-in. crossing of the Mobile river that went in just at the right time to avoid disadvantageous river and river bed conditions.

Florida itself is new pipelining country for the gas industry. The state has within its boundaries over 30,000 lakes worth hooking a name to. In addition, there are countless sloughs, ponds, draws, etc. The source of the lakes is underground cave-ins.

The length and breadth of Florida's peninsula is underlaid with a strata of limestone which is, in turn, laced with a maze of caverns. Unseen stresses collapse the caves and the overlay sinks into the void. Come the heavy summer rains, and another lake is born.

These sinkhole-formed lakes accentuate the fine water supply of the state. The limestone layer is the primary source of Florida ground water which is abundant and so vital to future industrialization. But, all of this water does not make building a natural gas project any easier.

The pictures of Florida pipelining tell the story.

• Protective coating

The coating system used on Houston Texas Gas & Oil's pipeline system is unique. The entire project is being tape wrapped with an outerwrap over it. Polyken tape is the protective coating selected. The outer wrap is Kermac Type-20.

The pictures on pages 122 and 123 illustrate the tape-wrapping operation.

The entire mainline of Houston Texas Gas & Oil Corp. from Baton Rouge, La. to Cutler, Fla. was tape coated. It is the first major natural gas system to be tape-coated from start to finish, and represents the largest single order for protective pipe coating ever placed.

Officials of Houston Texas Gas told me that the tape is "surprising everyone" and that they are "enthusiastic about it." Cathodic Protection Services (Houston) tested a 35-mile long section of tape-coated pipe with a Pearson holiday detector. Houston Texas

THE CENTRAL PART OF FLORIDA HAS IT BOTH GOOD

Gas & Oil reported that the results of this test showed 267 holidays—or eight holidays per mile. It is not unusual to turn up 75 holidays per mile from over-the-trench coating programs using hot-applied materials. The maximum holidays per mile located during the Pearson-run on the tape-coated 35-mile section was 15. And, only one shorted casing was found.

• Compressor stations

Houston Texas Gas & Oil Corp.'s compressor stations are somewhat unique. They are putting in 24,000 hp equally divided among four stations. The units will be 2000-hp, 4-cycle supercharged engines direct connected to horizontal balanced-opposed "pancake" compressor frames.

Half of the units will be Worthington SEHG-8's; the other half will be Cooper-Bessemer LS8SG's. There will be three 2000-hp units per station.

The locations are: Station 2 at Wiggins, Miss.; Station 4 at Munson, Fla.; Station 6 at Quincy, Fla.; and Station 8 at Brooker, Fla. Each is similarly designed and all were designed by WALCO Engineering & Construction Co. (Tulsa).

Figs. 1, 2, 3, 4, and 5 show some of the design details of a typical Houston Texas Gas compressor station.

LEFT TO RIGHT: River bottom sand between swamps and marshes in central Florida.

Backhoe floating on mats mucks out trench in a Florida swamp.

Palmetto floored low woodland was not hard going. But pipeliners had to watch themselves when off the right-of-way because snakes are thick in the environs. Surveyors, clearing gangs and others at the head of spreads wore knee-high aluminum leg guards for protection against snake bite.

AND BAD, TOO

LEFT TO RIGHT: This is mucky swamp where ground water gives you trouble. In areas like this, it is nearly impossible to get enough backfilling to hold pipe from floating out where ground waters well up (near Kissimmee).

Typical central Florida cypress swamp. On 18-in. pipe going through here, it takes 2100-lb river weights on 15-ft centers to keep the tube from floating out. Set the weights on 17.5-ft centers, even, and up the job comes.

Dam is built higher to keep water from a slough out of a trench that is being dewatered. There's plenty of quicksand back in these swamps, too.

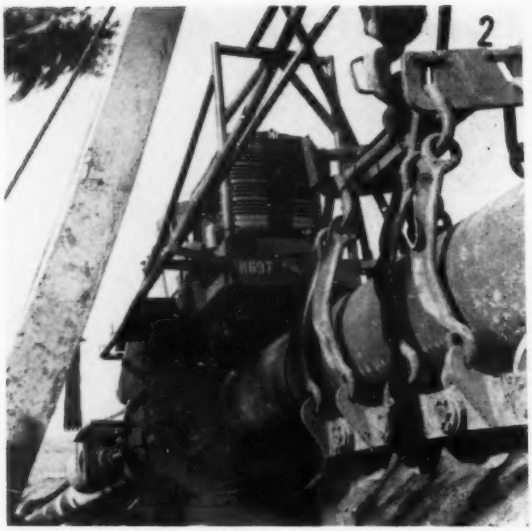
Compression ratios are in the 1.50-to-1.56 range. The stations feature unitized operation. Units will be operated from one-man start-stop panels designed by Walco and built by the engine manufacturers. Pneumatic controls are specified, with no electric connections to the engine boards. Mason-Neilon instrumentation is standard in the stations.

The shutdown blowdown systems are pneumatic, using Shafer 18 x 4.5 valve operators mounted on Walworth Fig. 1667 weld-end plug valves. The yard piping is all tape-wrapped with Polyken, so no aftercooling is provided.

Other key compressor station equipment suppliers: Air filters—American Air Filter "Cycoil" oil bath type; air-cooled, fin-fan type radiators—Coynco (½), Young Radiator (½); silencers—Maxim; snubbers—Burgess-Manning; intake scrubbers — American Air Filter, horizontal, "Cycoil" type.

There is a 100-kw standby electric power generating plant at each station. Each of these has an E-M generator powered by a Waukesha engine. Worthington two-stage horizontal air compressors furnish starting air.

Pages 122-123 tell a picture story of tape-wrapping. Compressor station design details are on pages 124-127. Story ends on page 128.



TAPE WRAPPING OPERATION

1—The dope gang comes working down the pipeline. The over-the-ditch tape-wrapping gang does not resemble the conventional dope gang. There are fewer men and much less equipment on this tape job.

2—The cleaning and wrapping machine wire brushes the pipe surface, spins on the Polyken protective tape, and applies the outer wrap. The machine has a special yoke and is balanced to eliminate the need for anyone walking a Hoosier pole.

3—Spreadmen take a break as the tape-wrapping machine has run out of outerwrap. This is 24-in. pipe on which 18-in. rolls of Polyken tape were used. The tape overlap ran from $\frac{1}{2}$- to 14-in. OD and up. Note the holiday detector electrode directly behind the cleaning and wrapping machine.

4 and 5—From a stockpile near the right-of-way, outerwrap is obtained and a spreadman flips it on the spindle.

6, 7, and 8—And tape wrapping continues. On 24-in. pipe, material consumption was running at 370 squares per mile for Polyken tape with a 1-in. overlap. Kermac outerwrap went on at 380 squares per mile on this pipe. Other tape data: 285 squares per mile with 1-in. overlap on 18-in. OD pipe; 136 squares per mile with ¾-in. overlap on 8-in. OD pipe.

9—Unique "bull plug" permits cleaning and wrapping machine to get back on pipe after a skip for a road crossing without tearing up wire brushes. Contractor on this spread (schedule 3) was Mid-western-Walco.

10—Tape-coated pipe gets put to bed. Some 1570 miles of Houston Texas Gas system was, or is being, put to bed with the same coating system.

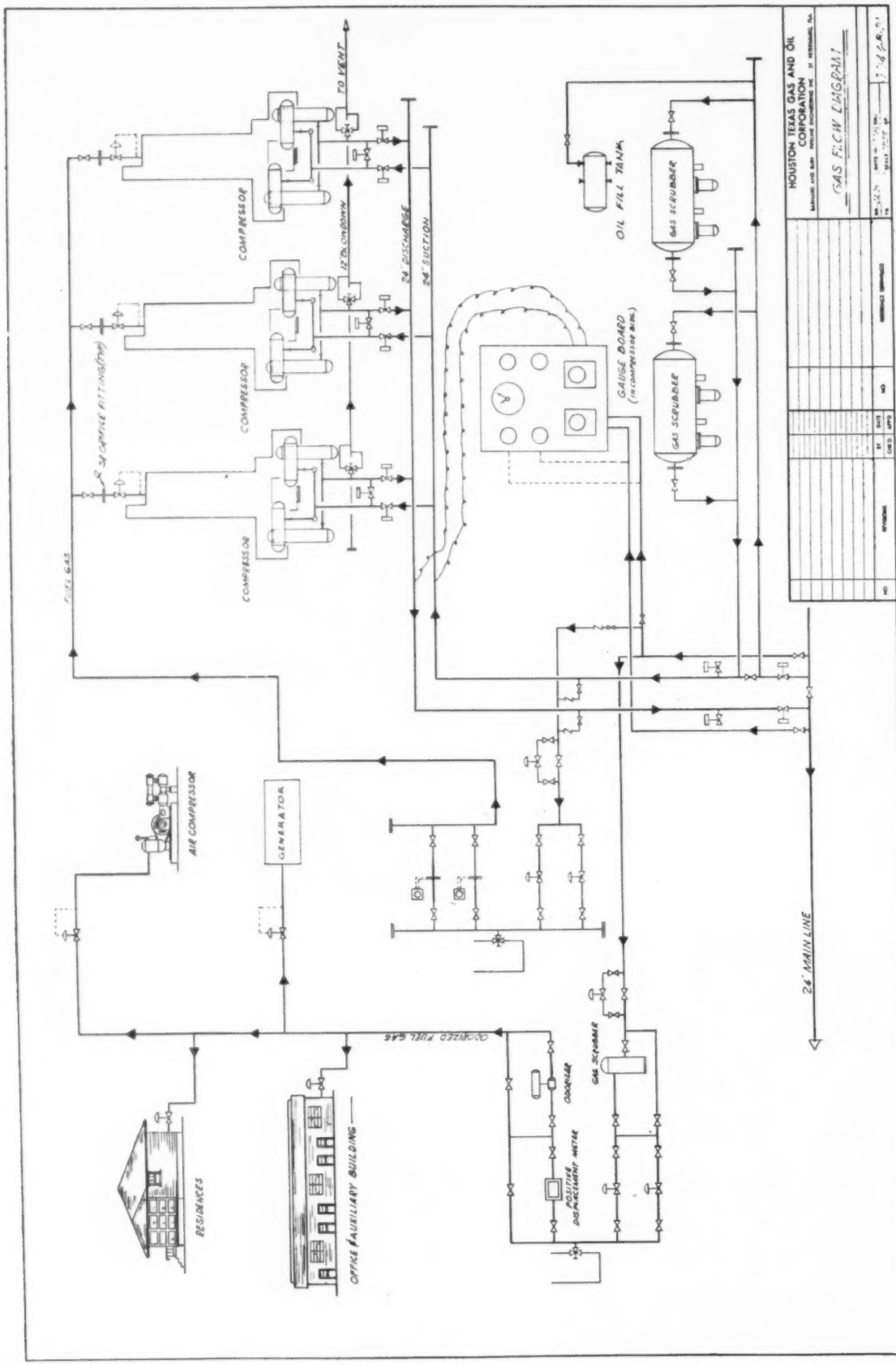


FIG. 1. GAS FLOW DIAGRAM.

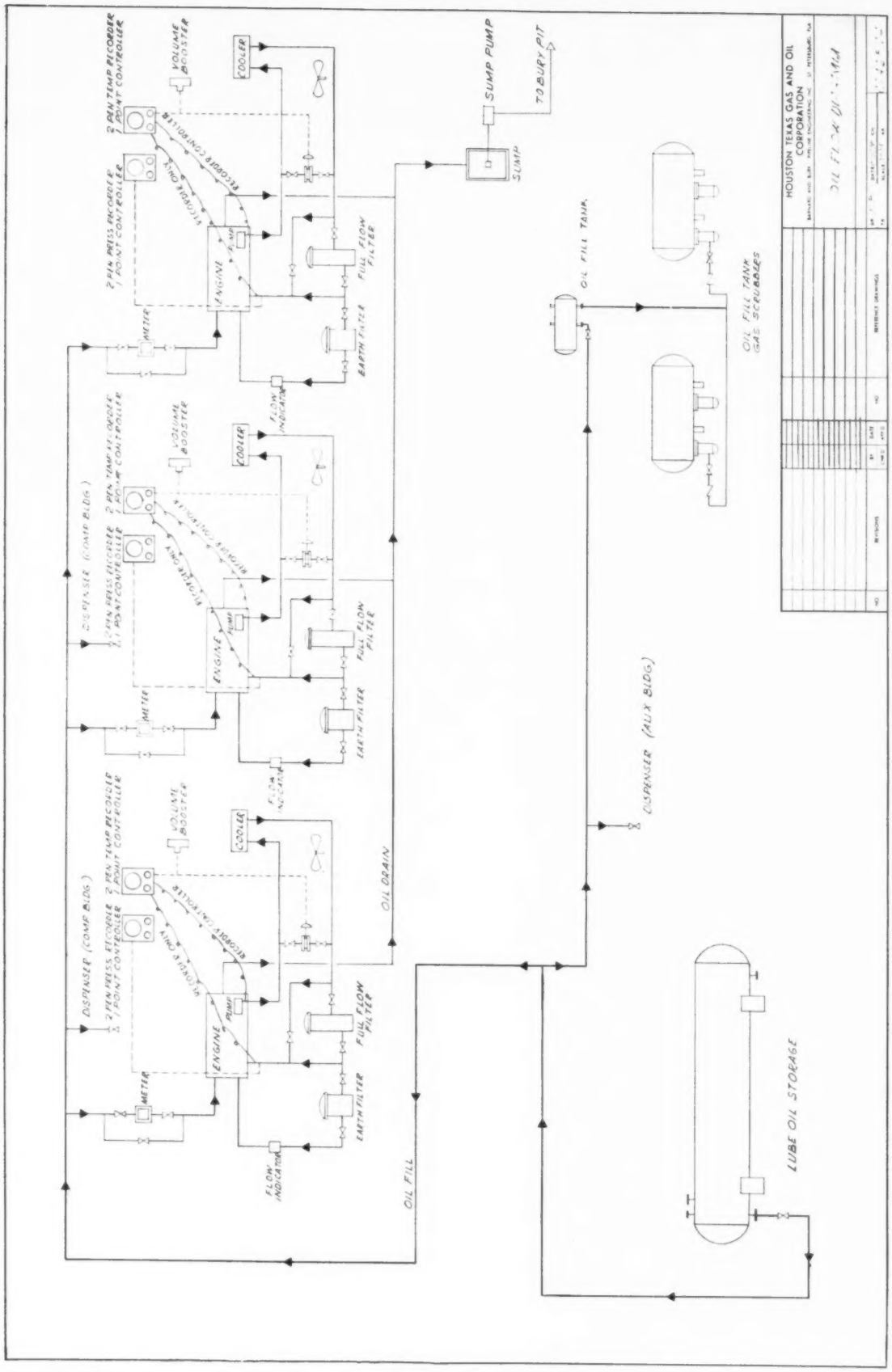


FIG. 2. OIL FLOW DIAGRAM.

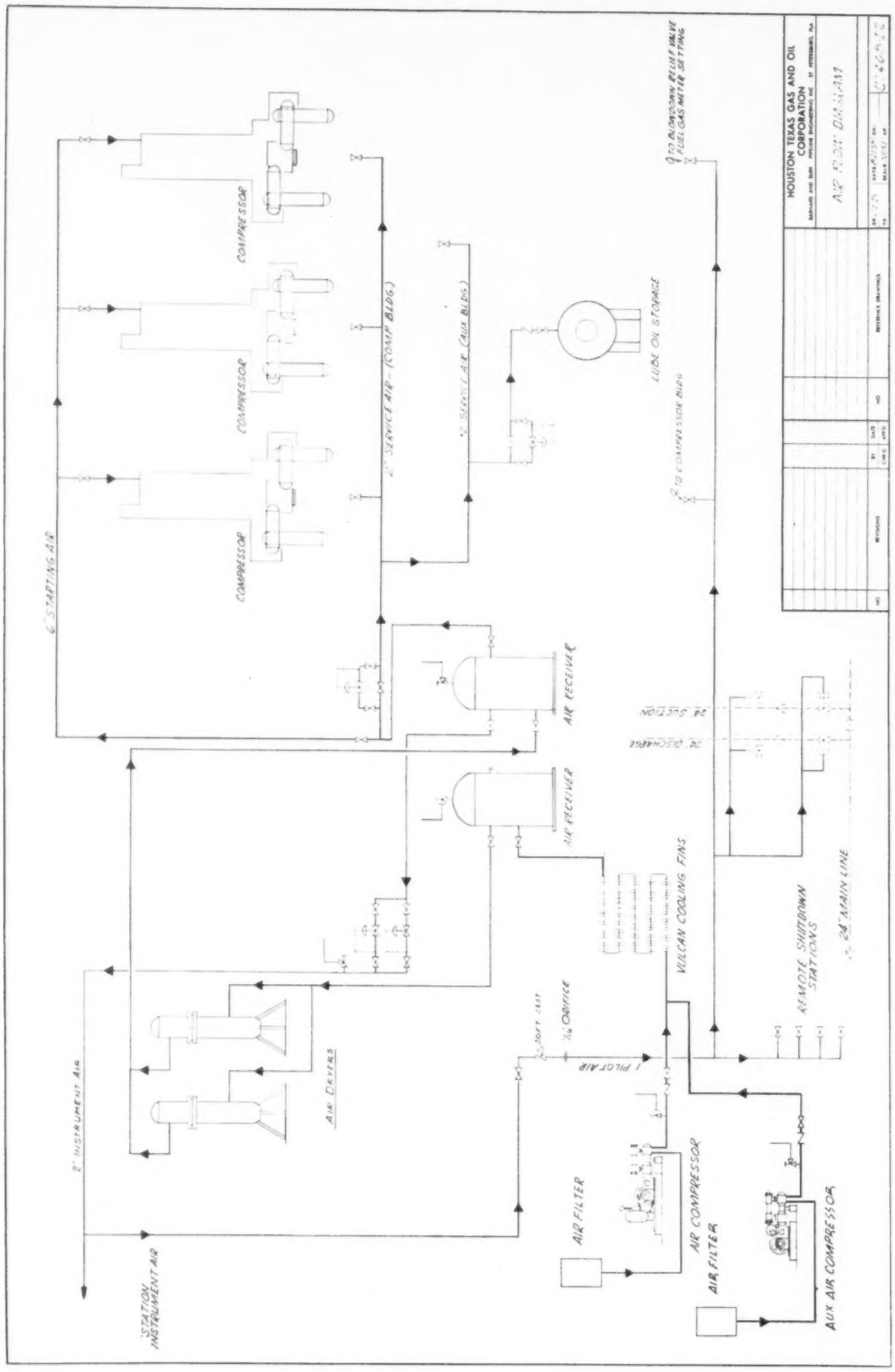


FIG. 3. AIR FLOW DIAGRAM.

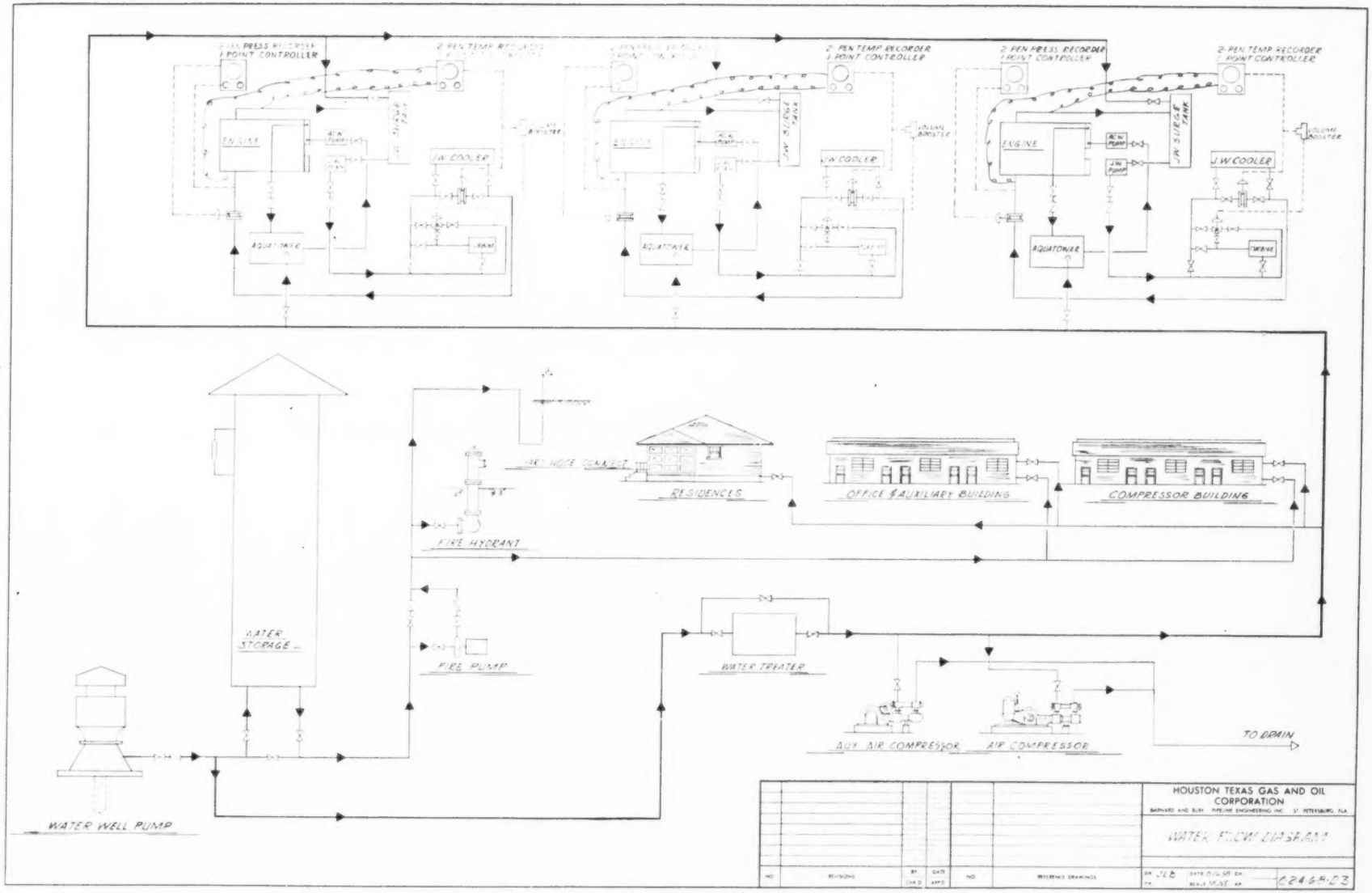


FIG. 4. WATER FLOW DIAGRAM.

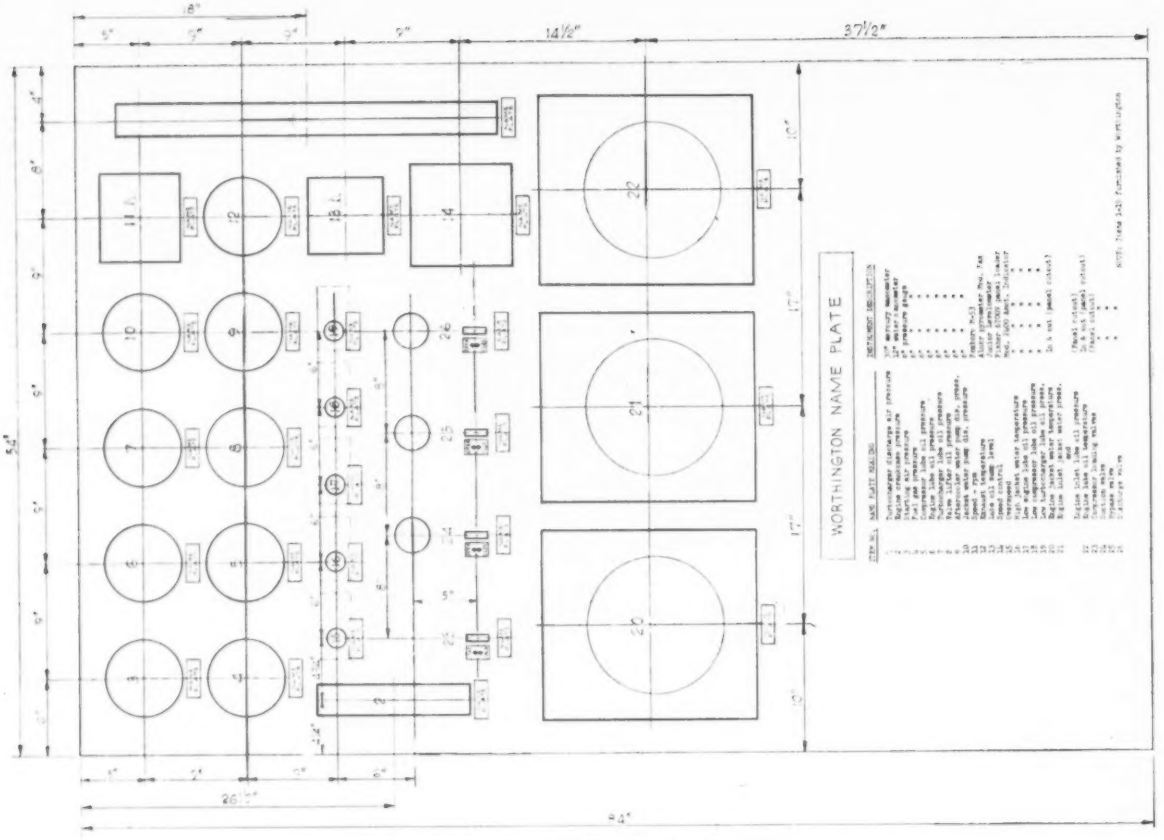


Fig. 5. Engine gauge board for Worthington SEHG-8.

• Other features of the pipeline

Cathodic protection design, engineering and construction for the Houston Texas Gas project is being handled by Cathodic Protection Service. Test leads are being installed during construction at all road crossings and at other selected points. The cathodic protection survey has been made and the line will be placed under protection shortly after completion of construction.

Down on schedule 6, there is some coral that had to be trenched through. This was certainly a change for gas pipeliners. It is very tough to work when dry, but it is not too bad to trench when wet.

Block valves will be spaced at approximately 14-mile intervals. Plug valves (Walworth) will be used in the assemblies for Houston Texas. The block valves will be aboveground with two 8-in. blowoffs. Initially, they will be manually operated.

There will be five overhead crossings on the Houston Texas Gas & Oil pipeline. These will be suspension type pipeline bridges of a unique design. Clear Span Engineering Co. (Houston) did the design and will enter a joint venture with Midwestern Constructors Inc. for the erection. These bridges will have towers fabricated with a special box-girder design. They are both economical and very cheap to erect. Rivers that will be jumped by suspension bridge are:

Pearl River (La.-Miss.)	520-ft span
Pascagoula River (Miss.)	660-ft span
Escambia River (Ala.)	640-ft span
Apalachicola River (Fla.)	960-ft span
Suwannee River (Fla.)	660-ft span

The communications system for the pipeline as initially constructed will be leased teletype from AT&T. At the St. Petersburg, Fla., dispatching center there will be readouts from all of Coastal's and Houston's compressor stations. In addition, some 16 control points will be telemetered, providing information on 35 different variables. Mobile radio telephone coverage will be provided over the entire pipeline system on 49.200 megacycles.

Plans are being firmed up for $2.8-million, completely integrated radio communications system. The microwave path will cover 2100 miles—the longest in the world. Mobiles and gas distribution systems will tie-in with VHF operating on 158.17 megacycles. The microwave system will be operated in the 6000 megacycle band, and will have 55 repeater stations along the pipeline with spacing averaging about 19 miles. Motorola equipment will be used.

From every indication available, and barring a good bit of force majeure, the Houston Texas Gas & Oil Corp. will layout with its part of the Texas-to-Florida pipeline well in advance of schedule. ■

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You'll find National Seamless Line Pipe available in a complete range of wall thicknesses, steel analyses and in diameters up to 26 inches—National Electric Weld Line Pipe up to 36 inches. For more information, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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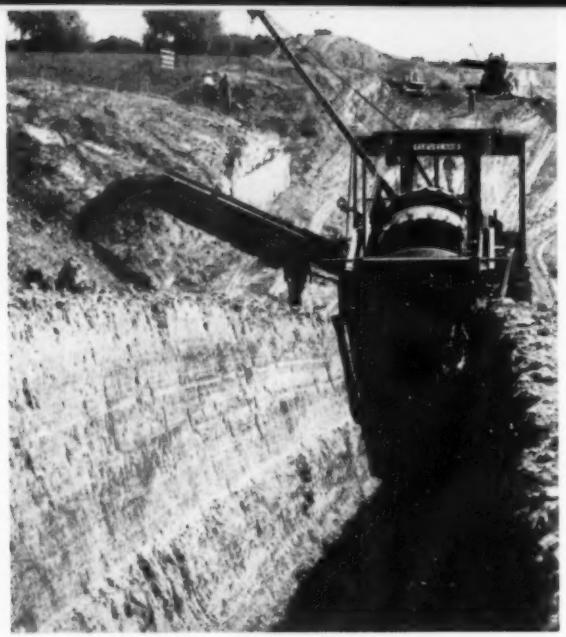

Up to 3000 ft of clean ditch a day were opened up. Finished ditch is 7 ft deep, 50 in. wide at the bottom and 8 ft wide at the top for the 36-in. pipe.

Conquering sharp ridges and river-bottom mud

HIGH lands or low lands—saw tooth ridges or mud—either can slow pipe laying to a crawl. Contracting & Material Co., Evanston, Ill., had these conditions back-to-back on 45 miles of its 81-mile project to lay a 36-in. gas pipeline from 10 miles west of Muscatine, Iowa, to a point near Princeton, Ill.

The job was part of the Texas-Chicago loop of Natural Gas Pipeline Co.'s expansion program.

Working across the high, dry farm lands of northern Illinois, the contractor faced a series of sharp ridges rising 40 to 50 ft high. The ridges were found in groups of two or three, covering approximately half of a 35-mile stretch extending east from the bluffs above the Mississippi river.

No fittings were used in the line, so each hill had to be cut back until the pipe could be laid with a 12-degree maximum bend per joint. A crawler tractor-scraper fleet was assigned to this 250,000-yd task. When conditions permitted, the tractor dozed the dirt aside. But in most cases hauls were over 200 ft, and the material had to be stockpiled on top of the ridges to preserve drainage. All of the material had to be replaced after the pipe had been laid, so piling it high first permitted fast dozing on cleanup.

Relying on experience gained in road work, Contracting & Material moved the bulk of the dirt with four Caterpillar D8 tractors pulling Cat scrapers, pushed by three big D9s and a D8. In about six minutes, each unit completed a 40-yd cycle, picking up a heaping 20-yd load as it was pushed down the hill, climbed up the opposite slope, dumped, returned, picked up a second load as it climbed the cut, and dumped this load on top of the ridge.

The grading crew, in two 10-hr shifts, cut a 75-ft wide slot up the side of a ridge in less than a day. The crew worked through the 35-mile area, then returned to fill the cuts.

Ahead of the grading crew, 26 men and a tractor cleared the 75-ft right-of-way.

Stringing was subbed to J. L. Cox & Sons, Raytown, Mo. Eight trucks, loaded with four sections of 40-ft pipe, were used. Hauls were up to 15 miles in the western part of the job, but were considerably longer on the eastern end. A D7 towed the trucks up the soft

Continued on page 138

Welding progresses rapidly. At the left, two pipelayers set pipe for beads. At the bottom of the hill, hot pass is made while finish welding is completed on the right.

Surrounded by mud, a tie-in crew make connection near a ditch in the river bottom. Three 6400-lb concrete weights and a D7 were needed to line up the ends. Pump helps dry the ditch.

For the Pipeline Industry . . .

the big news for 1959 is

JOHNS-MANVILLE FIBER GLASS

With L·O·F Glass Fibers Company joining the Johns-Manville family, your J-M representative can now supply a complete line of fiber glass pipe wraps to reinforce and protect underground pipeline enamels against damage.

For inner reinforcement of enamels—imbed porous J-M Blue Flag fiber glass mat in pipe enamel . . . strengthen it against cracking, soil-stress and backfill damage just as steel rodding reinforces concrete. Uniformity of pores allows enamel to bleed through the mesh quickly, minimizing holidays.

For outer enamel protection—bitumen-coated J-M Duramat fiber glass mat, reinforced with parallel strands of fiber glass yarn, gives enamels the tough, durable shield they need against earth loads, soil movement, handling and backfilling. Inorganic glass fibers do not absorb or convey moisture.

For wrapping joints and fittings—hand-applied J-M Duratape and Duramesh meet varying conditions. *For hot wrapping*, tough, pliable Duratape joint wrap—fiber glass mat plus heavy coal tar or asphalt coating—provides a strong high-dielectric barrier against corrosion. *For cold wrapping*, Duramesh porous fiber glass mesh—coated with asphalt-resin or coal tar—reinforces standard coatings, helps prevent cracking and holidays.

In the pipeline industry, as in many others, buyers of fiber glass products will now be served by an enlarged staff of Johns-Manville sales and technical personnel operating out of 56 sales offices . . . by expanded distribution facilities . . . by the addition of 7 strategically located plants and by expanded research and product development of fiber glass products.

Call your Johns-Manville representative or write to Johns-Manville, Box 14, New York 16, New York. In Canada, 565 Lakeshore Road East, Port Credit, Ontario.

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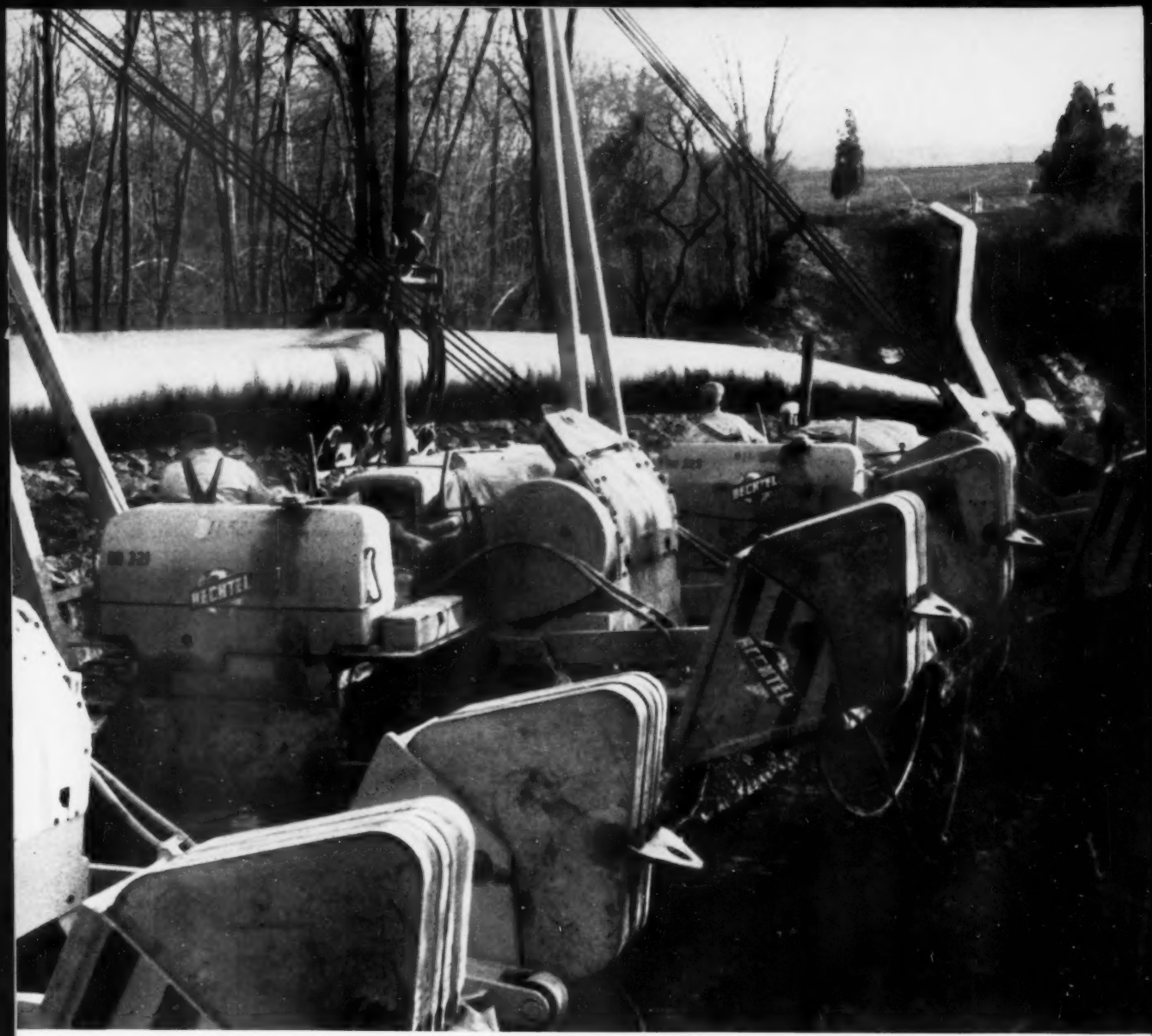
At our Steelton, Pa., plant we have new facilities for cold-expanding electric fusion-weld pipe *18 to 42 in. OD.* And on our new mill at Sparrows Point, Md., we produce electric resistance-weld pipe from $5\frac{9}{16}$ in. to 16 in. OD *in lengths to 60 ft.*

For top economy in every phase of pipe line construction and operation, use Bethlehem Steel Line Pipe. Let our nearest sales office quote on your requirements.



	SIZES (in., OD)	WALL THICKNESS (in.)	LENGTHS	SPECIFICATIONS
HYDRAULICALLY EXPANDED ELECTRIC FUSION-WELD (submerged arc)	18 through 24 26 through 36 36 through 42	¼ to ½ incl. ¼ to ⅜ incl. ¼ to ¾ incl.	40-ft	API 5LX, Grades X42, X46, X52 & X56
ELECTRIC RESISTANCE-WELD	5 (nom) to 16	API	to 60-ft	API 5L, Grades A & B API 5LX, Grades X42 & X46
CONTINUOUS BUTT-WELD	½ to 4 (nom)	API	SRL 24 to 26-ft DRL to 50-ft	API 5L
COMPRESSOR STATION PIPE in diameters, thicknesses, and lengths as required.				

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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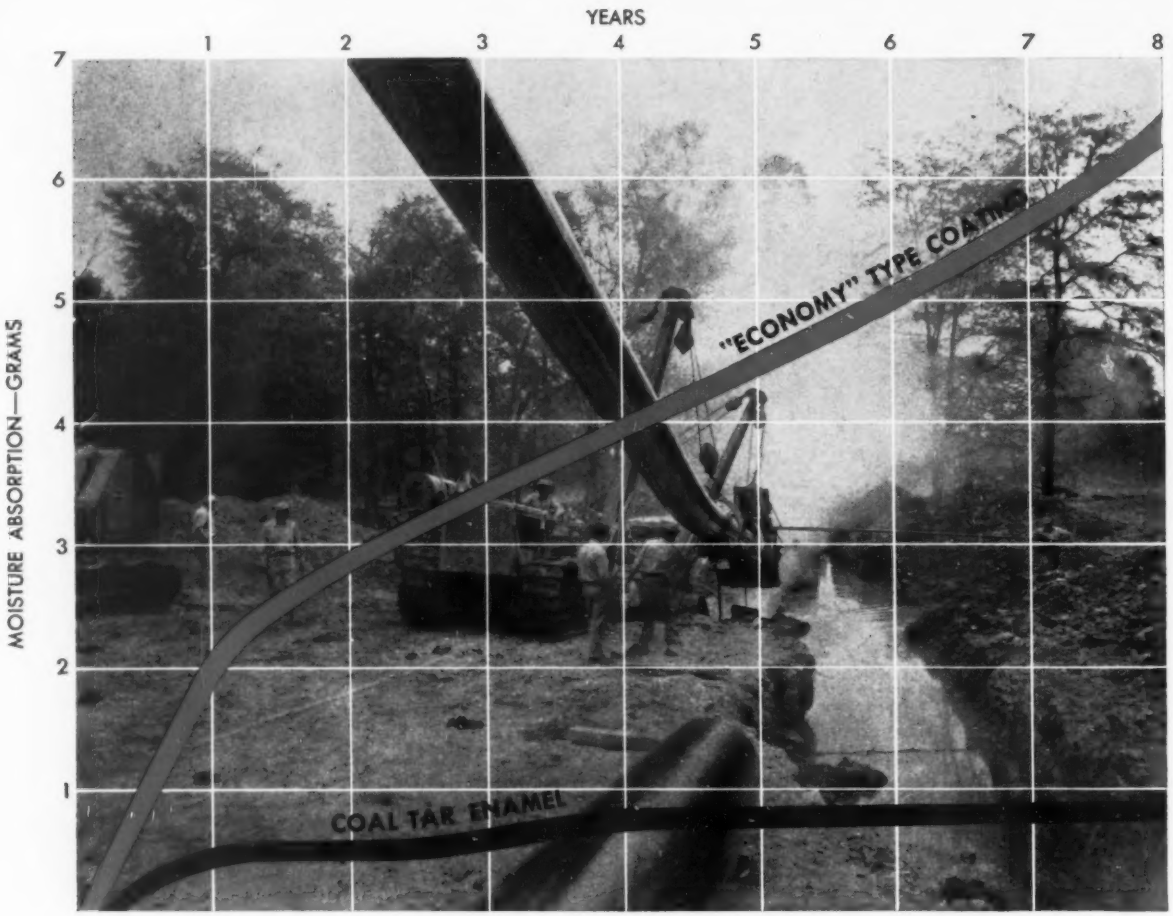

This Moisture Absorption Comparison Shows Why Most Pipelines are Protected with COAL TAR ENAMELS!

THE chart above, prepared by an independent pipeline engineer*, shows why an overwhelming majority of pipeline owners and operators select *coal tar enamels* to protect their underground investment. No other coating material can *begin* to match the ability of coal tar enamel to resist moisture absorption.

Field tests show that an "economy type" coating exhibits a constant moisture absorption increase. The continuously increasing cost of cathodic protection soon eats up any first-cost savings in material. Peeling and deterioration eventually require expensive reconditioning.

So why risk the chance of costly failures with an "economy" coating or other protection methods not *proved by time?* Specify PITT CHEM Coal Tar Coatings and be *sure* of economical, long-lasting protection.

PITT CHEM maintains a full-time staff of field service men to work with your field men in the efficient application of pipeline enamels. *Write us about your protection requirements . . . today!*

**Name upon request*

★ PITT CHEM® Coal Tar Pipeline Enamels
★ PITT CHEM "Insul-Mastic"® Gilsonite-Asphalt Coatings
★ PITT CHEM "Tarset"® Coal Tar-Epoxy Resin Coatings
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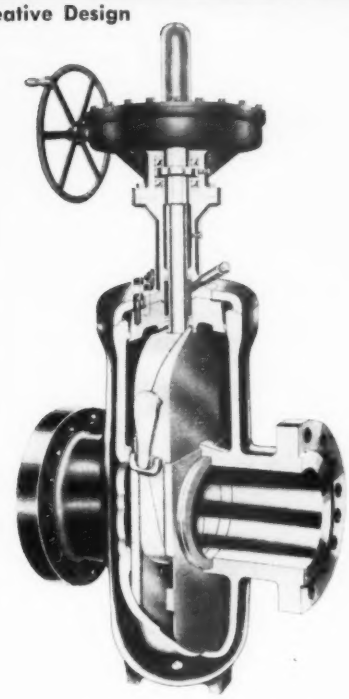

W-K-M® ASA Gate Valves

Features include: Parallel expanding gates • Through-conduit • Exclusive gate centralizer • Replaceable seats • Pressure seal bonnet • Lubricated seats • Two thrust roller bearings • Super-finished stems.

Design assures: No-surge operation • No turbulence • No pressure drop • Free passage of pigs or scrapers • Easy operation • "On-the-line" overhaul.

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W-K-M's creative engineering is a continuous process that begins with a study of pipeliners' valve problems. It proceeds to design . . . extends through production . . . reaches a climax with the most rigorous testing procedures in the business: Every W-K-M valve passes tests that go far beyond the requirements of your operations.

W-K-M ASA Gate Valves are the best you can use in pipeline service. No other valves compete in design or quality of production.

For performance you can depend on, specify W-K-M when you requisition valves.

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Above: The 36-in. pipe gets cleaned and primed. Two pipelayers handle cradling and catch-off duties. Close behind cleaning operations (right) comes a dope and wrap machine, placing

¼-in. coating of asphalt or coal tar, wrapped in kraft paper and fiber glass. Finished pipe was put back on the skids to cure at least over night before being lowered in.

grades along the R-O-W, where a TD14 with a sideboom unloaded the pipe.

Ditching moved at nearly normal rate through the ridges. Once clear of the grading, each of the two 320 Cleveland ditcher and one 51 Buckeye ditcher cut 3000 ft per shift of ditch 7 ft deep, 50 in. wide at the bottom and 8 ft wide at the top.

Striking almost due east, the line crossed a road about every mile. A 42-in. casing was punched under the roads with a Crose boring machine cradled by a TD24. Most crossings were about 100 ft long. Bucyrus-Erie backhoe opened a hole for the boring machine.

In the rough terrain, 12-degree bends came constantly. In two days, 68 out of 110 joints were bent, using a Cinch bending machine and two pipelayers.

Welding progressed rapidly. Two MD7s handled pipe for the pipe gang. Eight welders used four 250-amp Lincoln arc welders for beads and two twin arc welders on hot pass. A similar crew did the welding. Welds were inspected by Industrial X-Ray.

Lowering-in moved slowly across 10 miles of Mississippi river bottoms. Water filled the trench and soft banks crumbled as pipe is swung into the ditch. Ahead of the pipelayers, ditch is clammed out.

Pipe was cleaned by a Perrault cleaning machine, with one pipelayer cradling and another for catch-off. Doping and wrapping was handled by another Perrault machine, using a 3/32-in. coating of asphalt going into the Geneseo compressor station and coal tar coming out. A layer each of kraft paper and fiber glass protect the pipe. Finished pipe was put back on the skids to cure at least over night before being lowered in.

The other pipelayers were broken into three spreads, one for lowering in and two on tie-ins. Each spread had three 583 pipelayers and either an HD20 or HD21 with sideboom. Each of the tie-in crews had a twin arc welder.

Lowering-in and tie-ins progressed slowly across the wet river bottoms, extending two miles east and seven miles west of the Mississippi below Muscatine. Mud banks and high water table combined to impede work.

Soft banks crumbled as the pipelayers prepared to lower in, holding up operations until the ditch could be cleared. Meanwhile, a battery of Rex pumps pulled water out of the ditch, slowly gaining as water gushed back through cut field tile. Concrete saddles—weighing 6300 lb—were used, at the rate of about 50 per day, to help hold the buoyant pipe under the mud.

A Cleveland backfiller followed the lowering-in crew, pulling the spoil back over the pipe. A tractor worked with each tie-in crew filling the ditch and cleaning up the right-of-way.

The worst area for water was across a shallow lake —1500 ft through water 1½ ft deep. First an elevated road was built across the lake for the pipelayers, pulling sand from the ditch with a backhoe working on 20-ft 8x8s. Then the lake was drained so tie-ins under railroad tracks could be made. It took constant pumping and the use of a well point system to complete this portion of the job.

All of the equipment was moved across the river by barge.

Pipe is 36-in. OD, of two weights. One weighing 166.17 lb per ft with a wall thickness of .4375 in., was used under road crossings. The other, weighing 130.9 lb per ft with .334-in. wall thickness, was used for the rest of the job. ■

nature is not enough

No natural resource serves man until imagination—the mind's eye—finds the way to use it. Natural gas, for one, lay idle under the earth . . . or was flared as waste . . . before the long-distance pipeline made its heat and energy available to millions.

Now gas and oil—through petrochemistry—are being made to yield even more benefits. Endless chains of new products . . . and many more to come . . . all springing from that greatest natural resource of all—mindpower.

From natural gas and oil . . . heat, power, petrochemicals that mean ever wider service to man.

TENNESSEE GAS TRANSMISSION COMPANY

LEADING PROVIDER OF ENERGY—NATURAL GAS, OIL AND THEIR PRODUCTS

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Coated and Wrapped Miles Apart

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IDENTICAL TWINS!

Dramatic proof of the absolute uniformity of PLS quality-controlled pipeline protection

No matter which Pipe Line Service Plant is applying protection, you can count on the identical high quality standards of *uniform protection* . . . mile after mile of pipe.

Pipe Line Service protection can provide this kind of identical uniformity due to precisely controlled production, using methods and machines which have been specially developed for this purpose over a long period of time.

Why not make sure of maximum service life for your pipe investment . . . with *uniform* Pipe Line Service protection? Like the chain with a weak link, lack of uniformity is equivalent to no protection at all. Get full details from the Pipe Line Service sales office nearest you.

Sales offices at all plant locations . . . and Atlanta, Ga.; Dallas, Tex.; Houston, Tex.; Lincoln, Nebr.

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GAS • PIPELINE NEWS

FPC examiner grants Phillips rate increase of $14 million per year

FPC Presiding Examiner Joseph Zwerdling filed a decision April 6 that Phillips Petroleum Co. (Bartlesville, Okla.) should be allowed to increase its annual rates by $14 million a year—$35 million less than the company sought.

The decision, subject to commission review, could well set a price-fixing formula affecting natural gas rates of 3000 independent producers who come under FPC regulation.

This rate proceeding is an outgrowth of the Phillips decision of June 7, 1954, when the Supreme Court ruled that thousands of independent producers selling to interstate pipelines were under FPC regulation.

Examiner Zwerdling determined that Phillips total cost-of-service to be $57 million, compared to the company's claim of $92 million. The examiner also concluded that unless Phillips was permitted to recover its total cost of service, its ability to render required service might be impaired and the public interest damaged.

In determining that the total cost of service was $57 million, Mr. Zwerdling also ruled that Phillips must be allowed to recover all of this amount on all contracts, regardless of whether or not price revisions were authorized under contract terms.

Examiner Zwerdling noted that while there was a large number of seriously contested issues in the proceeding, the $35 million difference between the cost of service determined by him and that claimed by the company resulted principally from differences in treatment of four major issues. They are:

1. Phantom taxes—Phillips contended that the amount to be allowed for income taxes should not be computed on the basis of its actual income tax liability, which is low because of the 27.5 per cent depletion allowance permitted under the Internal Revenue Code, and because of the expensing of intangible well drilling costs also permitted under Treasury regulations. Phillips argued it should be allowed as income tax expense the higher amount it would have paid if these tax benefits had not been available. The examiner rejected this proposal, and computed income tax expense on the basis of actual liability.

2. Rate of return—The examiner allowed Phillips a return of 9.25 per cent, compared with the 18 per cent return sought.

3. Allocation of joint exploration costs between oil and gas—Phillips allocated 61.8 per cent of exploration costs to gas, using the Btu method under which the allocation is based upon the relative heating value of the oil and gas produced by the company in the test year. The examiner rejected this method and allocated 30.5 per cent of exploration costs to gas, using a "reserves added realization" method, under which the allocation was based upon the relative values of oil and gas reserves added through successful exploration during the most recent five-year period.

4. Adjustment to purchased gas cost—Phillips claimed that as a result of rate increases granted to it in this proceeding it would automatically have to pay higher prices for gas bought from other producers because of escalation provisions in its contracts. Accordingly, it contended that all such increases should be included in and added to its claimed cost of service in this proceeding. The examiner rejected this on the grounds Phillips' own producer-suppliers also are subject to FPC regulation, and cannot increase their rates without meeting the standards of the Natural Gas Act.

Phillips is expected to take the case before the full commission, and then, if dissatisfied, to the Federal courts. Early reaction from Phillips indicated the company felt the increase granted in the decision was far short of what they felt entitled to.

Texas Illinois plans compressor additions

Texas Illinois Natural Gas Pipeline Co. wants to build new facilities in Texas, Arkansas, Missouri and Illinois. Total cost: $4.1 million.

In Docket G-14829, Texas Illinois proposes to add 2000 hp to each of eight mainline stations in Texas, Arkansas, Missouri, and Illinois. The 16,000-hp additions will cost about $3.9 million and increase peak day sales capacity of the company's system by 20 MMcf daily. Presently authorized capacity is 504 MMcf per day.

In Docket G-17094, Texas Illinois seeks to build 10 miles of 8-in. line in Hidalgo and Starr counties, Texas. The $234,700 line would be used to buy gas produced by Shell Oil Co. in the North Rincon field. The 8-in. line would be operated by South Texas Natural Gas Gathering Co., Corpus Christi.

Cold coating machine-applied on 30-incher

Corrosion prevention on some sections Trans-Canada Pipe Lines' system is provided by a special Roskote Mastic formulation, A-717-F. Engineering design of the line is such that piping on the discharge side of compressor stations could reach temperatures up to 210 deg. F. Roskote Mastic is designed to withstand this temperature.

The regular 3-in. pump available on all line-travel machines circulated the Roskote through a fish-tail half shoe placed at the top of

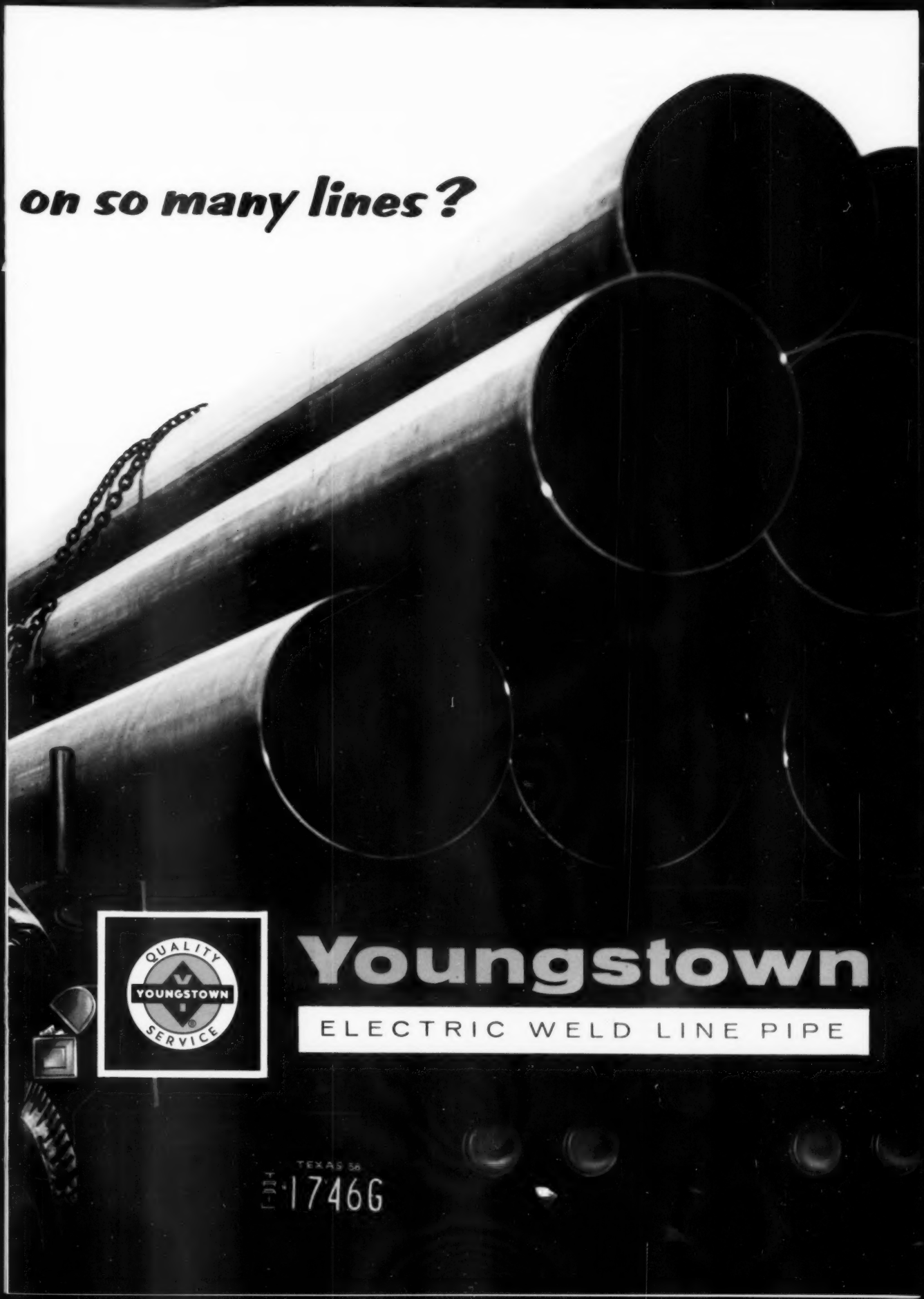
Oklahoma Constructors coated 30-in. pipe with Roskote Mastic. Shown here are the spray shoe and drag ring designed for cold application.

Why is this Youngstown pipe used

All Youngstown Line Pipe is given a thorough final visual inspection before shipment. Trained inspectors carefully examine the pipe for possible imperfections which might interfere with its field performance. Every length is inspected for dimensional accuracy. That's one more reason why Youngstown pipe can be found on so many lines.

Because Youngstown Line Pipe helps simplify and speed up the job. You can order Youngstown Line Pipe in high test A.P.I. weights and grades . . . and in these sizes: Seamless—$2\frac{3}{8}$" to 14" O.D., Continuous Weld—$\frac{1}{8}$" to $4\frac{1}{2}$" O.D., and Electric Weld —$6\frac{5}{8}$" to 22" O.D. For more information about Youngstown Line Pipe contact our sales and service offices throughout the oil and gas-producing country.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Youngstown 1, Ohio


on so many lines?
QUALITY
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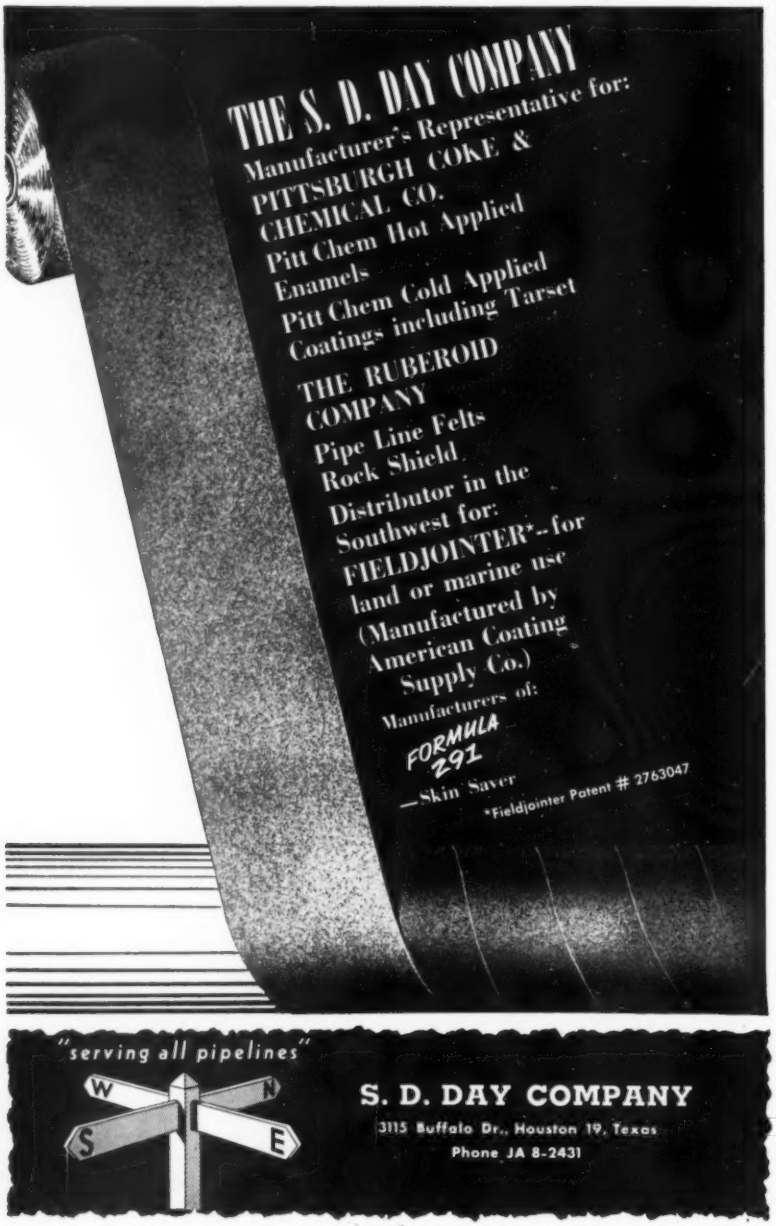
the machine. A flood-shoe was used to bathe the bottom of the pipe with Roskote. Then a specially designed Roskoter, 360-deg. ring, attached directly to the line travel machine immediately behind the flood-shoe and top-half shoe, extruded a smooth, uniform film.

Only one dope pot per spread is required when using Roskote, resulting in fewer men, no fumes, no waste due to freeze up or coking, and less fuel costs.

Depending on the terrain, 8000 to 12,500 ft of pipe was coated per day with an 8-man crew. In a few instances where the terrain was flat, free of bogs, etc., the Roskote was applied at the rate of 4800 ft per hour.

Morrison-Shivers Ltd. coats Trans-Canada's 30-in. pipe over-the-ditch.



Michigan, Midwestern sign Canadian gas pact

Michigan Wisconsin Pipe Line Co. has a contract with Midwestern Gas Transmission Co. for the purchase of 158 MMcf of gas daily. The gas will be imported into the U. S. from Trans-Canada Pipe Lines Ltd.

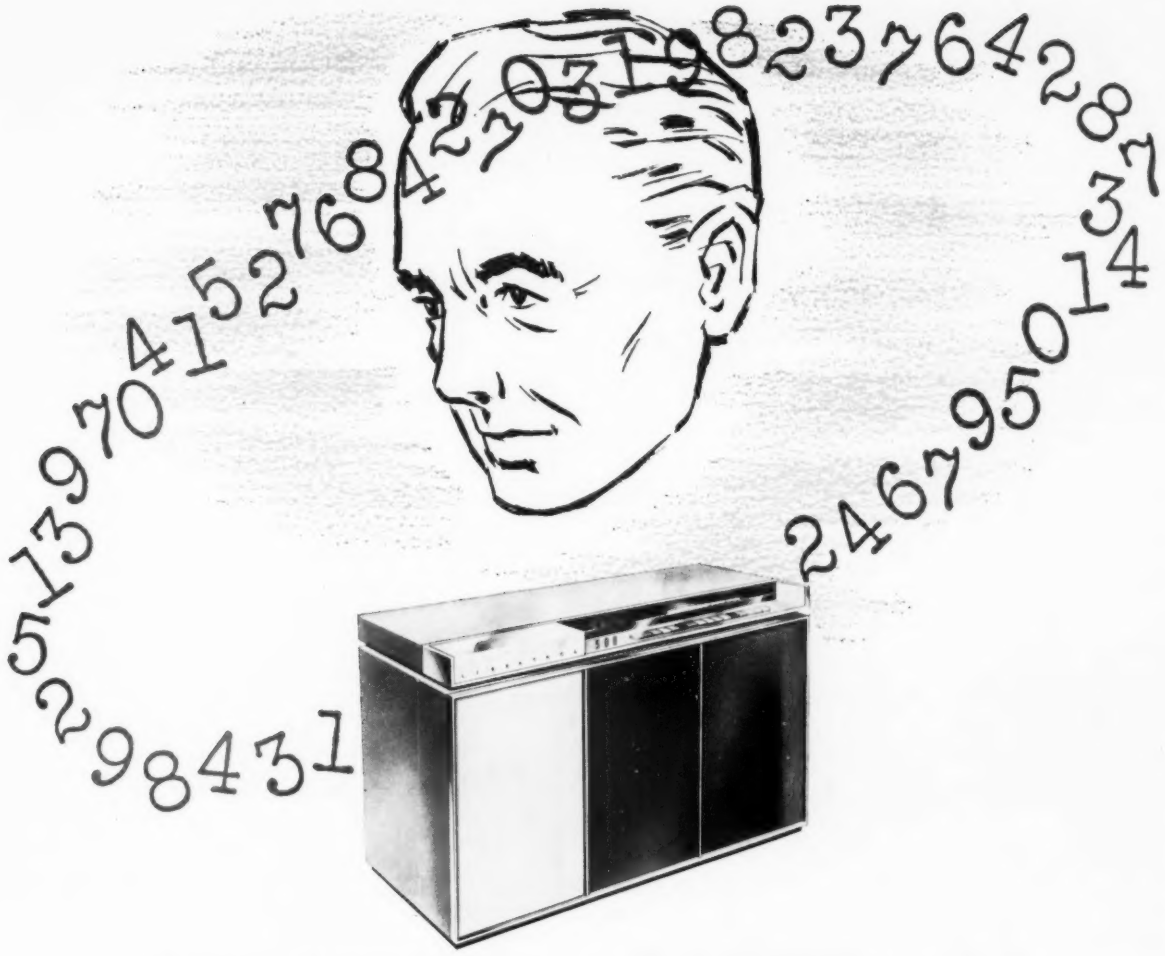
The contract places the American Natural Gas System, parent of Michigan Wisconsin, in the unique position of having three separate and distinct sources of gas supply.

Under terms of the agreement, Michigan Wisconsin gets 79 per cent of the proposed initial gas importation by Midwestern. It also has the right to buy 75 per cent of all additional gas which Midwestern may import from Canada in the future.

FPC, of course, must sanction the importation of the Canadian gas and the $95 million construction projects of Michigan Wisconsin and Midwestern. Trans-Canada also must obtain approval of Canadian authorities for the exportation of gas.

Initially, Midwestern will pick up about 200 MMcf daily at a point on the U. S.-Canadian border south of Winnipeg. From there, Midwestern will build 500 miles of 24-in. pipe to central Wisconsin. Michigan Wisconsin will pick up the gas near the town of Marshfield. Areas along the route of its line will be supplied with gas by Midwestern. Cost to Midwestern: $54 million.

Continued on page 159



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...anyone with a head for figures can program this digital computer for on-line application!

Any accountant or engineer – anyone who can work out a sequential problem on an ordinary desk calculator – can program the GPE Controls Libratrol-500. It is by far the easiest digital computer to program and operate.

For example, command and address data are a part of every word. This arrangement insures accurate programming without a great deal of specialized knowledge and training. An engineer can learn to program a simple problem in two hours.

Libratrol-500 was designed for industrial automatic control–designed for simple yet comprehensive operation. Your GPE Controls man can give you all the facts.

Test vehicles and pilot plants as well as industrial processes can benefit from the flexibility and simplicity of the Libratrol-500.

See the Libratrol-500 IN ACTION at the 5th World Petroleum Congress Exposition, Booth 376, New York, June 1-5

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GPE Controls, Inc. (formerly Askania Regulator Company)
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GPE Controls — A GENERAL PRECISION COMPANY

A Subsidiary of GENERAL PRECISION EQUIPMENT CORPORATION

Careful supervision of a wide geographical area over 100 miles in length is the watchword at Long Island Lighting Co.

The Long Island Lighting Co., a combination company, strives to maintain a 100% Load Factor, on purchased gas. Naturally, to avoid contract penalties the load variation requires careful supervision of the gas distribution system.

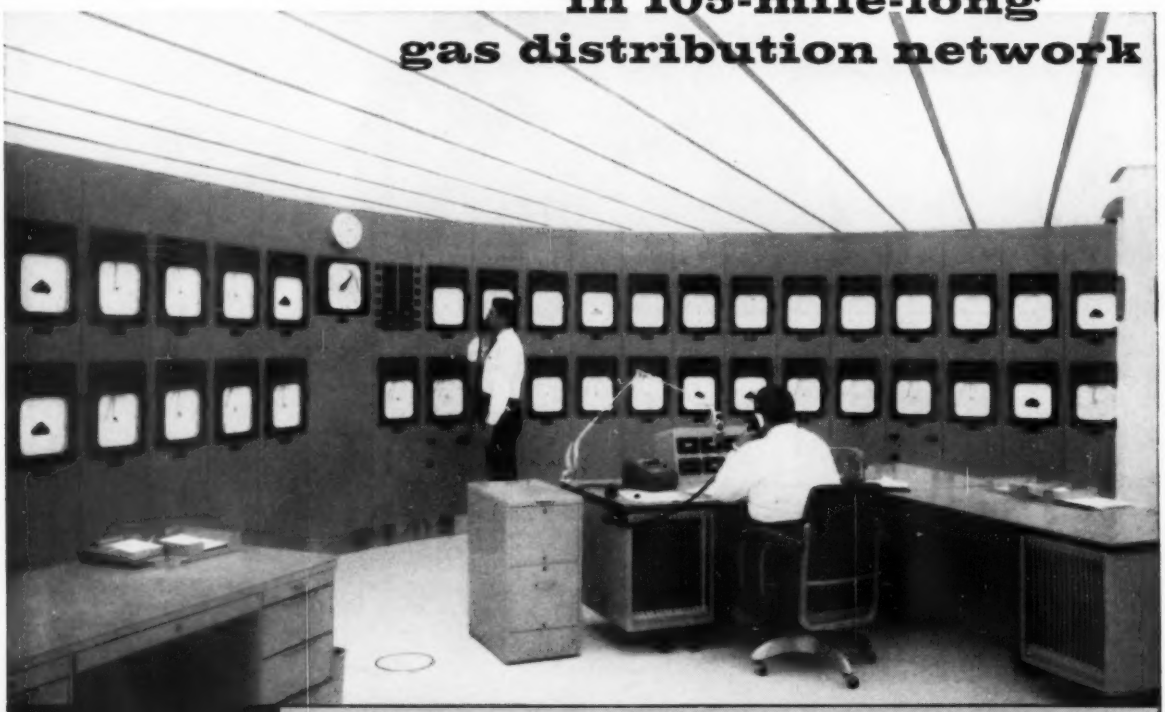
Only one dispatcher per shift controls the distribution system—24 hours a day, 7 days a week. Bristol telemeters put continuous status information at the dispatcher's finger tips: individual flows, pressure of gas at gate stations, amount of gas purchased at gate stations as well as status of the distribution system with pressures telemetered from important points on the Island.

Long Island Lighting anticipates that their gas load will more than double by 1962 and their Bristol instrumentation is flexible enough to take this increased demand in stride.

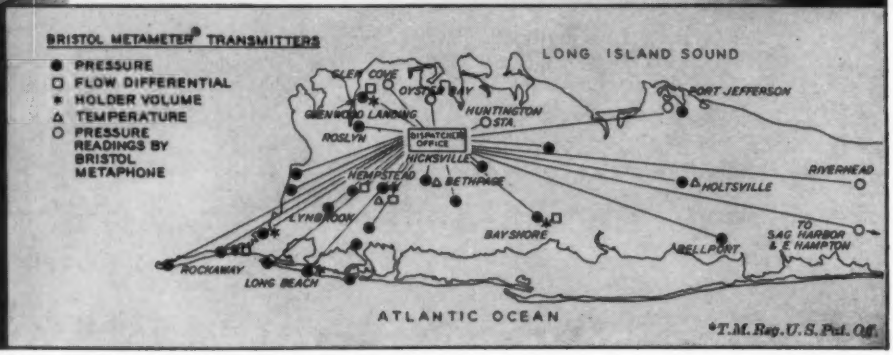
Why not find out what Bristol telemetering can do for you? Better pressure regulation during unexpected demand periods, avoidance of contract penalties, security against interruption to service from abnormal conditions are just a few of the benefits you can expect. Distances can be anything from "in-plant" to hundreds of miles. Write: The Bristol Company, 119 Bristol Road, Waterbury 20, Conn.

9.10

BRISTOL TELEMETERING helps maintain load in 105-mile-long gas distribution network



Bristol Metameter® Receivers on gas dispatcher's panel at Long Island Lighting Company's Hicksville, N. Y. Operations Center. These recording instruments make possible precision operation of a distribution network over 100 miles in length (see map).



BRISTOL *TRAIL-BLAZERS IN PROCESS AUTOMATION*
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Communications and Automation

Edited by FRANK CHAPMAN

New dual-beam microwave system

HOW much reliability does an electronics user want to buy? This is a question that often perplexes the communications engineer in gas companies. The esthetic principle involved can make a breach in communications engineer-top management relations, too.

A "dual beam" microwave system has been introduced by General Electric to produce what that company calls the answer for the electronics user who needs the ultimate in equipment reliability. The new equipment will be first used by a public power utility in the Pacific Northwest. It will provide communications between a major power generating plant and a sub-station.

The dual-beam feature involves simultaneous and continuous transmission from both normal and standby RF equipment associated with the microwave system.

Signals received and transmitted on both "normal" and "standby" will be connected to individual dipoles using a common parabolic reflector as the antenna. This is made possible by the use of a cross-polarization technique which permits one of the RF equipments to be linked to a horizontally polarized dipole in the antenna while the other is connected to a vertically polarized dipole.

Both transmitters will operate on the same frequency, permitting the dual-beam or parallel operation without using more frequency spectrum than is normally used with a standard 2 KMC microwave system.

According to G-E microwave engineers, greater reliability is possible with the dual-beam technique because both RF equipments operate continuously and the possibility of an interruption in the system due to RF failure is eliminated.

The receiver outputs are fed into a combiner unit which adds the two signals inversely proportional to their individual noise content and presents the composite signal to the multiplex. If the signal from one receiver decreases, or its noise content increases, the combiner unit detects this change and reduces the contribution of this receiver to the composite output. If both receivers provide equal signals, the combiner unit adds the two signals and provides an output approximately 3 db better than would be obtained from a single equipment.

The common practice in the past has been for microwave users to employ various types of standby equipment to protect their systems operation against component failure. All such standby systems, including "hot filament standby," require varying lengths of time to switch, to warm up, or to stabilize. These periods of time that elapse before normal standby equipment is in full service can cause significant interruptions in continuous functions, such as telemetering, which are served by microwave.

The dual-beam system requires no switching time, no warm up time, and no stabilizing period because transmission is continually taking place from two transmitters.

In the first installation of the new system, the microwave equipment (G-E 2KMC) will provide protective relaying for two 230-kv transmission lines as well as telemetering and voice dispatch circuits to coordinate the link between a power plant and a transmission system.

New tower design tested

The newest tool of the burgeoning microwave industry has been successfully tested and proved.

Technical representatives from major producers of microwave systems saw a slender 260-ft transmission tower of a new design withstand forces equal to 85-mph winds.

The structure was undamaged after the test and its minor deflections were well within the limits prescribed by microwave's "line-of-sight" operation. Alprodco Inc. is the developer and manufacturer of the tower.

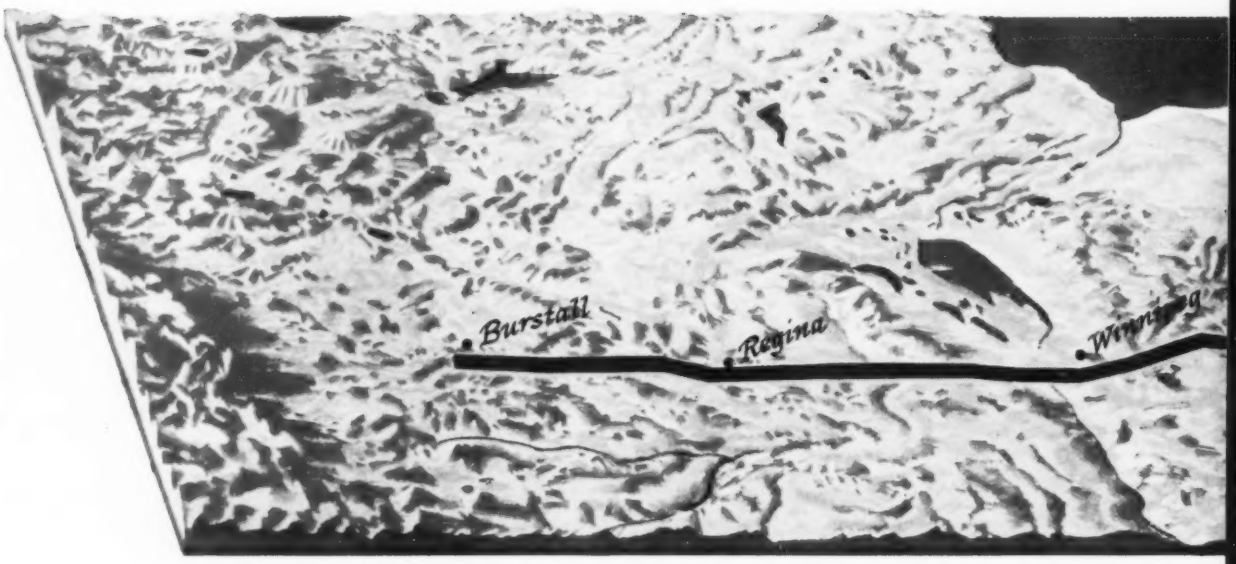
Small tower sections had been tested to prove engineering formulas. This was the first full-scale tower to be subjected to pressures equal to those of hurricane winds.

The tower was fabricated from structural tubing supplied by Armco Steel Corp. The 3-in. diameter, 12-gauge tubing was formed from Armco's patented ZINCGRIP steel. Armco's Sheffield division supplied special fasteners and Union Wire Rope Corp., an Armco subsidiary, furnished wire rope for the tower guys.

To test the structure, a 240-ft auxiliary tower supporting a complex system of weights and cables was erected alongside. A winch applied even pull to the test tower from ground level to the peak. Stresses at essential points were calculated from strains measured with wire gauges bonded on tower members and connected to instruments in a laboratory on the ground. The tower's twist was measured by use of a surveyor's transit aimed at a mirror on the tower's top. Deflection was measured by another transit sighted on the tower from the side.

Under forces equal to 85-mph winds, the top of the tower deflected only 6 in., and maximum twist was about one half of one degree. Neither change exceeded the allowances permitted microwave towers — which beam their ultra high frequency radio signals on a precise line from one tower to another. ■

←22 tortuous



Trans-Canada Pipe Lines completed ahead of schedule despite shifting sands, diamond-hard rock, white water and tricky muskeg

This immense project began in 1954 when 76 miles of 20-inch pipe was laid from Niagara to Toronto. Since then — construction has proceeded ahead of schedule and within estimated costs. Today, Alberta natural gas, rather than gas from American sources, can be delivered at rates of 620 million cu. ft. a day through the main 30- and 34-in. line.

The line spans turbulent rivers, the Great Sand Hills, hard rock and spongy muskeg. Frequently, the work progressed despite temperatures to 48° below zero.

A. O. Smith was one of the major suppliers of pipe for this 2290-mile line which is now delivering natural gas to homes and industries along its route — an area containing three-fifths of Canada's population.

For over 30 years . . .

A. O. Smith line pipe has always been manufactured to a high standard of quality . . . precisely controlled at every step of production. That's why A. O. Smith pipe, made and installed in 1928, is still in operation. That's why so much A. O. Smith pipe is in nearly every important high-pressure line.

90 → miles!

Spanning 2290 miles, the Trans-Canada line reaches from the Province of Alberta to Montreal . . . and proposed additions will extend the line as far east as Quebec.

Typical of nature's efforts to thwart completion of the line were temperatures ranging to 48° below zero. Nevertheless, work progressed ahead of schedule and below estimated costs.

The formidable Laurentian Shield was blasted, ripped, drilled and shattered to make way for Canada's longest natural gas pipeline. Going was rough, but the rewards for Canadians were far greater.

Through research A.O. Smith *. . . a better way*

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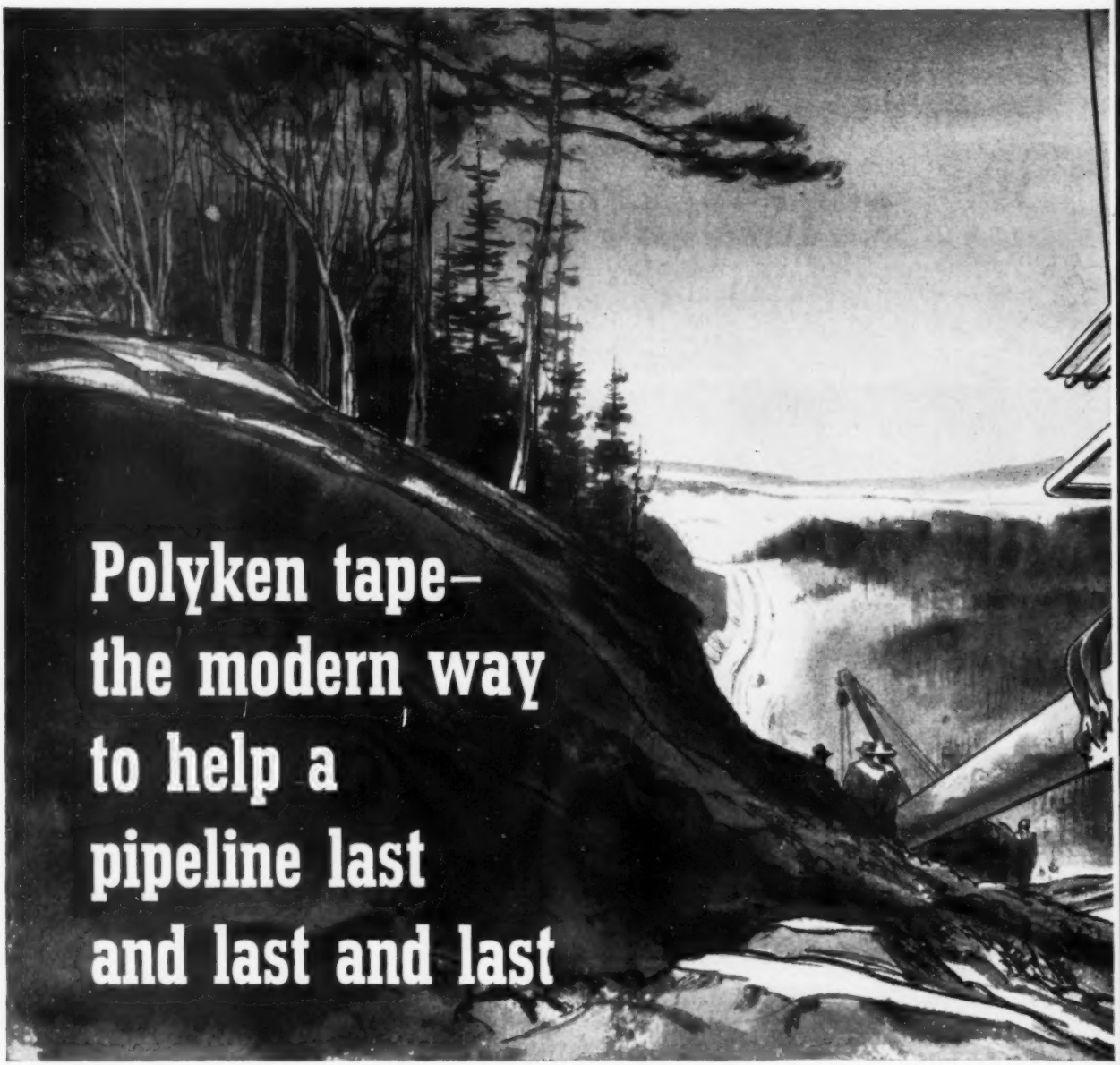


Polyken tape– the modern way to help a pipeline last and last and last

Polyken polyethylene tape, noted for its construction economies, now proves its dependability on the big jobs.

There's good reason why more and more pipeline is coated this way today—the modern way—with Polyken tape.

The reason is *performance.*

Take the experience of the Houston Texas Gas and Oil Corporation—the largest single pipeline coating order in history.

First, they had their engineering staff give Polyken intensive corrosion-resistance and performance tests. They checked the experience of other users. They studied tape construction practices as an important source of applied quality control. They analyzed tape coating spreads and saw the actual difference in unit operations and costs between the Polyken method and the ordinary enamel method.

Polyken passed with flying colors.

Then they added up the dollars and discovered that a Polyken-wrap job would save them better than half a million dollars, compared with the conventional "hot dope" coating.

Advantages like these can be yours. To get the full story on how Polyken can do a better job for

you—and save you money—call your Polyken Representative, or write Polyken Sales Division, 309 W. Jackson Blvd., Chicago 6, Illinois.

Polyken®

EXPERIENCED IN PROTECTIVE COATINGS

THE KENDALL COMPANY

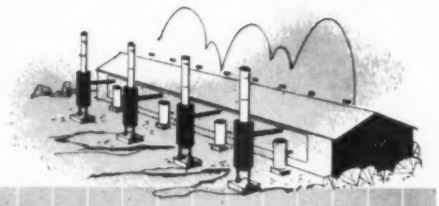
Polyken Sales Division

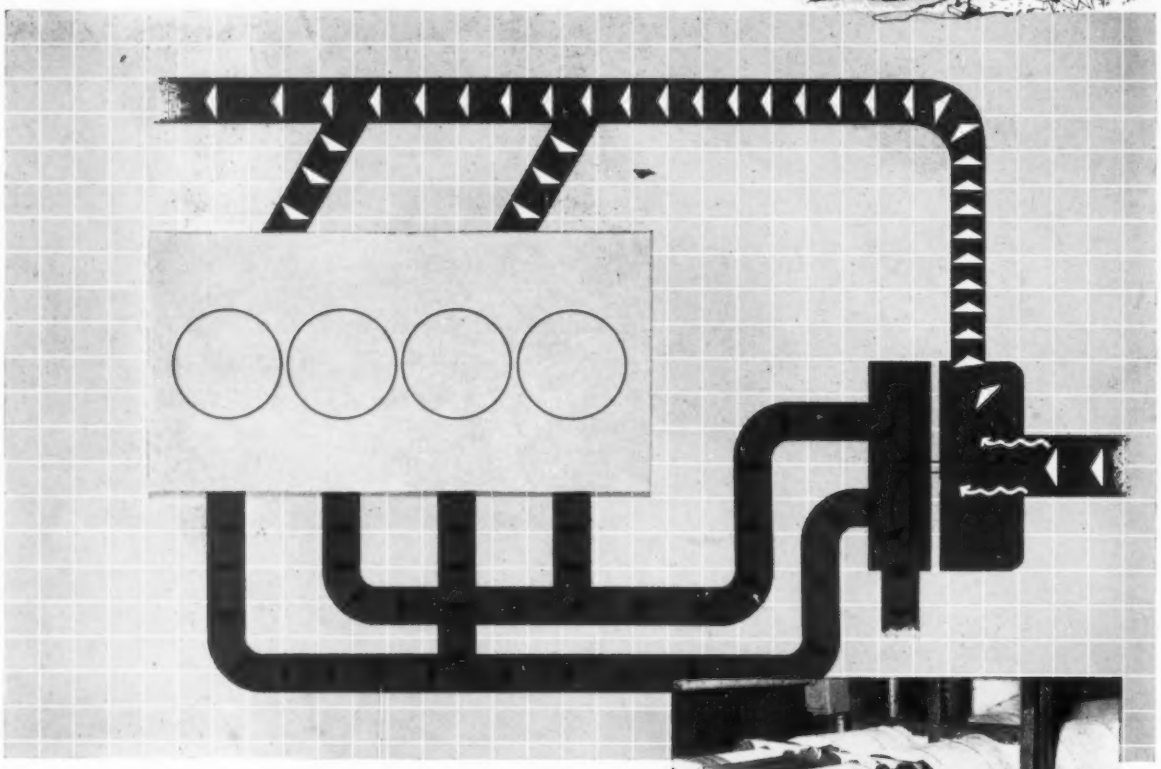
↑ Pipeline is simultaneously cleaned and wrapped. Polyken Tape (dark spools) goes on without a primer, in factory-uniform condition... then is overwrapped (gray spools).

← The Houston line gets Polyken-wrapped pipe into the ditch immediately after coating. Fieldmen say this method makes for a tight, clean, fast spread.

Flexonics

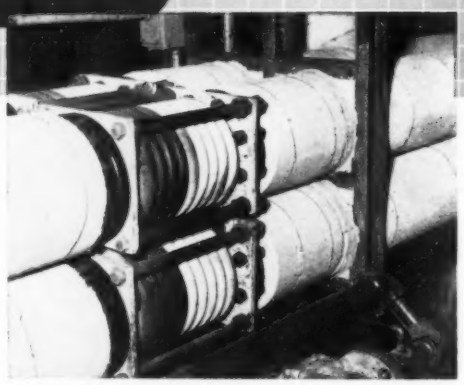
has the engineering experience to help you solve exhaust expansion problems when you turbocharge compressors





Here's a lively subject – *increasing gas pipeline capacity by turbocharging existing compressors in the field.* If you want the answers to the expansion problems that arise when the exhaust piping becomes an integral part of the operating loop, call on FLEXONICS engineers. They have the *specific* experience in this field that can mean actual dollar savings to you.

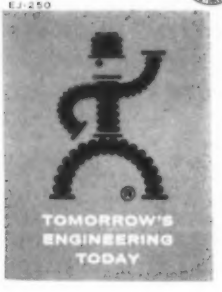
Write today for your free copy of this easy-to-read report. It tells you the dollars-and-cents facts that led an important pipeline company to a complete turbocharging program.



Special-design FLEXONICS Expansion Joints in the exhaust piping of a newly turbocharged compressor station.

Member Expansion Joint Manufacturers Association

EJ-250



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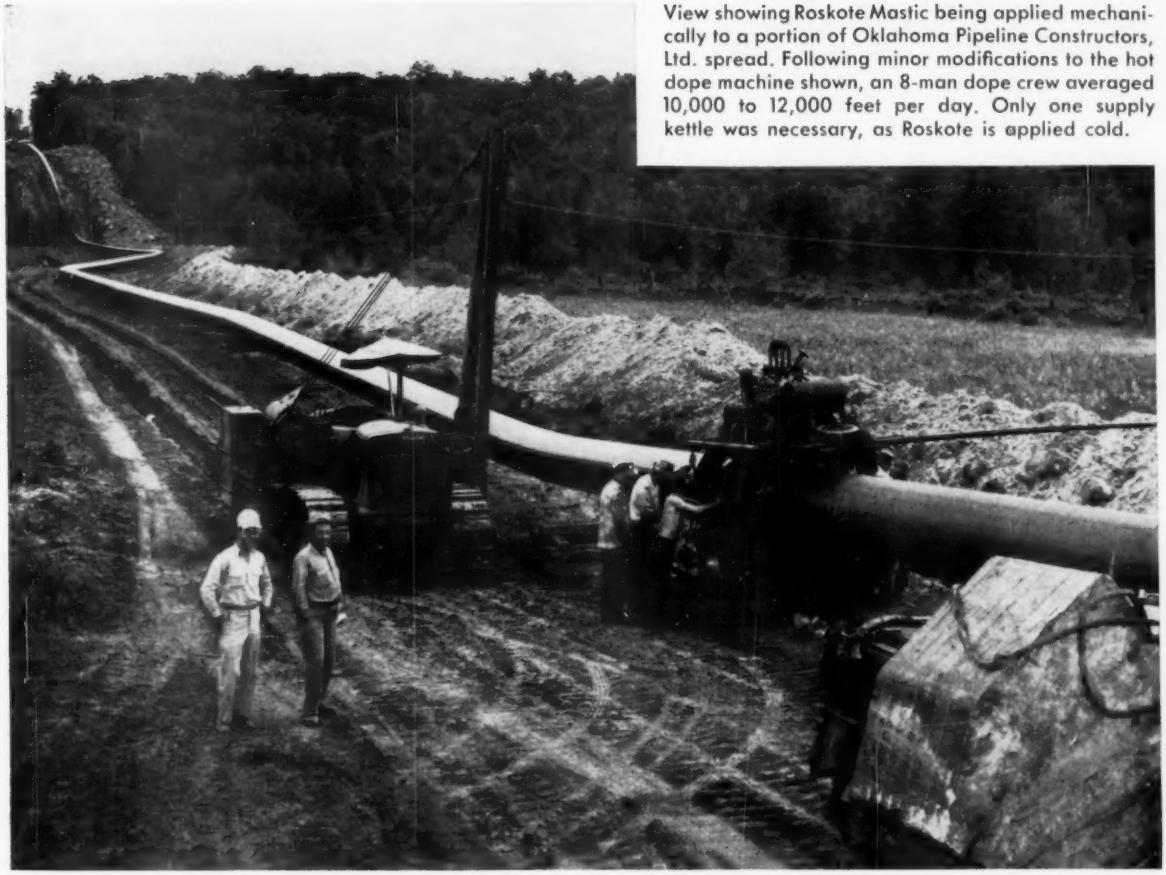

View showing Roskote Mastic being applied mechanically to a portion of Oklahoma Pipeline Constructors, Ltd. spread. Following minor modifications to the hot dope machine shown, an 8-man dope crew averaged 10,000 to 12,000 feet per day. Only one supply kettle was necessary, as Roskote is applied cold.

Roskote Applied Cold with Line Travel Equipment on Trans-Canada 30 Inch

Over rough terrain, with a right of way that crossed solid granite, muskeg, swamp and glacial till, and working under adverse weather conditions, the world's longest and most difficult pipeline construction — Trans-Canada Pipe Lines, Ltd. — has been completed.

One contributing factor in the success of this construction was the adaptation of standard line travel dope machines for the easy application of Roskote cold mastic. This combination of Roskote Mastic and modified line travel machines made possible the coating of ten to twelve thousand feet per day of 30-inch piping on the downstream side of the compressor stations.

Contractors* were able to carry on the coating operation with an 8-man dope crew, using only one supply kettle, requiring no heating fuel and thereby eliminating toxic fumes and fire hazard.

*Contractors on Trans-Canada who applied Roskote by line travel equipment:
Morrison-Shivers, Ltd., Majestic Contractors, Ltd., B. C. Rivers Construction, Ltd., Dutton-Williams Brothers, Ltd. and Oklahoma Pipeline Constructors, Ltd.

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Please send me complete information about the economics and application of cold-applied Roskote Mastic with line travel equipment.

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Company _____

Address _____

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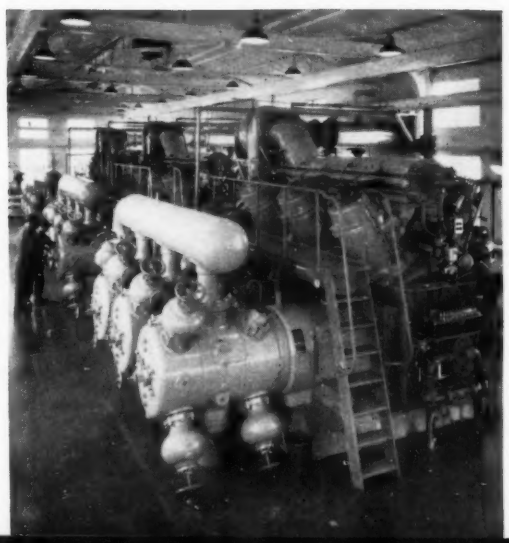
Exterior view of Utica Station.



The three compact 6-cylinder Cooper-Bessemer GMVC Compressors are rated 1000 hp at 300 rpm. Two have been in service since 1957. One was added in 1959.

Victor G. Fulkerson, *Head Engineer, Utica Station, New York State Natural Gas Corporation, explains...*

How the new Utica Station meets growing demands with Cooper-Bessemer Compressors

"Our Utica Station was built in 1957 to boost gas pressure for the mounting demands of the Albany-Schenectady area. It housed two 1000 hp Cooper-Bessemer Series-Turbocharged V-Angle Compressors. Then, a demand for 20 million cubic feet more gas daily required the addition of a third unit of the same type and size this year (1959).

"Averaging about 85 million cubic feet per 24 hours, the station has pumped peak loads of as much as 140 million cubic feet. Entering the station at 400-700 psi, the gas is discharged at 600-900 psi."

FACTS ABOUT COOPER-BESSEMER SERIES-TURBOCHARGED V-ANGLE COMPRESSORS

Peak Load—Plus Capacity. Plenty of reserve power, always ready for those unexpected extra demands, provides a big economy advantage.

Low Fuel Consumption. Guaranteed not to exceed 7200 Btu/bhp-hr at full load!

Less Housing Cost. Compact V-angle design, combined with 40% power increase of series turbocharging, means today's highest power-to-space ratio, with no increase in piping or cooling requirements.

Minimum Oil Consumption. Cooper-Bessemer "cocktail-shaker" piston cooling, precision-honed cylinders, and advanced piston and ring design, combined with highly efficient, full-flow filtration, results in exceptional lube oil economy.

Low Maintenance. Many factors contribute to records of trouble-free performance—the simplicity of V-angle 2-cycle design, fewer moving parts, accessibility, conservative ratings, and, extremely significant, vibrationless operation.

Write For Bulletins. Complete details on Cooper-Bessemer V-Angle Compressors are given in bulletins... free on request. Call our nearest office to help you plan new facilities.

BRANCH OFFICES: Grove City • New York • Washington • Gloucester • Chicago • Minneapolis St. Louis • Kansas City • Tulsa • New Orleans • Shreveport • Houston • Greggton • Dallas • Odessa Pampa • Casper • Seattle • San Francisco • Los Angeles

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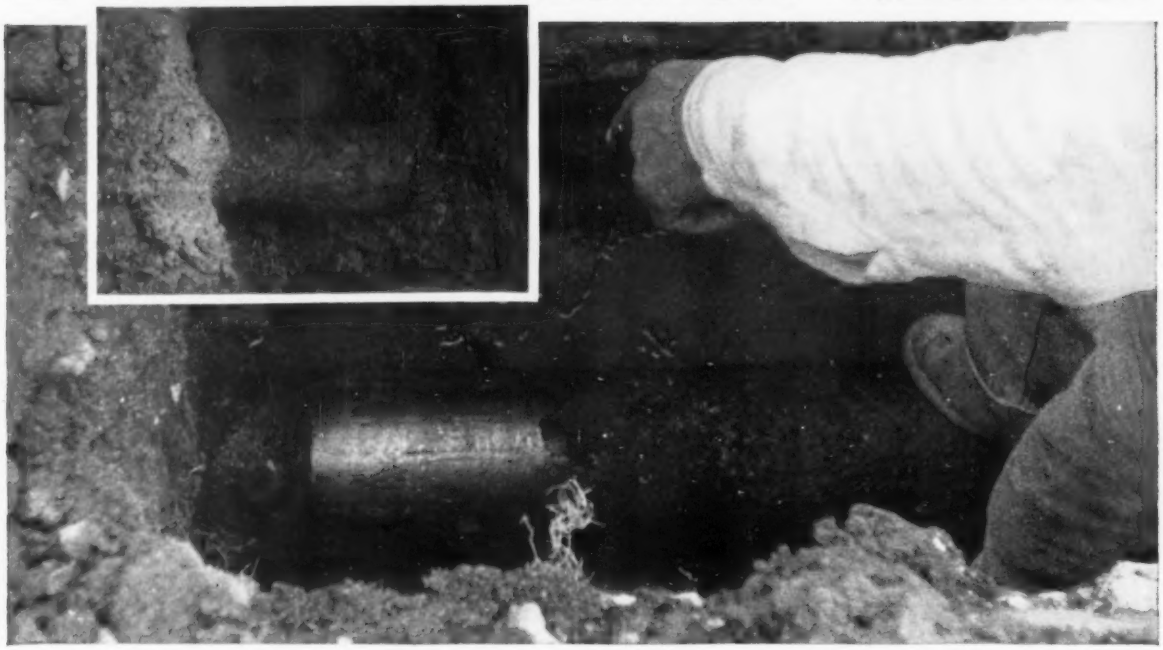
17-YEAR PROTECTION RECORD!



Year After Year...More Evidence Proving That TAPECOAT® Adds Years of Service Life to Gas Lines Underground or Under Water

Right across the country, TAPECOAT installations prove that you get more for your money when you measure pipe protection with a calendar.

Since this cost-cutting coal tar coating in tape form was first introduced in 1941, it has demonstrated its ability to withstand severe conditions underground or under water. TAPECOATED lines dug up after 17 years of service show no signs of deterioration on the pipe.

Typical is the experience of a utility in a coastal area. For a thorough trial, this company applied TAPECOAT in areas where severe corrosive conditions were known to exist. The lines were dug up this year and, after years of service under severe conditions such as brackish waters and corrosive soil, the pipe showed no signs of corrosion, proving the quality of TAPECOAT protection.

In terms of preventive maintenance and replacement costs, performances like this emphasize the most important consideration in buying protection. Remember, TAPECOAT is a hot-applied coal tar coating in tape form—designed for lasting protection on pipe, pipe joints, service connections, mechanical couplings, fittings, insulated lines, tanks, tie rods, and other steel surfaces vulnerable to corrosion.

TAPECOAT comes in rolls of various widths and is available in asphalt. Where primer is desired, specify TC Primecoat, the compatible coal tar primer.

A TAPECOAT sales and service engineer is always available to help you on any corrosion problem. Write for complete details today!

The TAPECOAT *Company*

ORIGINATORS OF COAL TAR COATING IN TAPE FORM

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REPRESENTATIVES IN PRINCIPAL CITIES

Manufactured and distributed in Canada by
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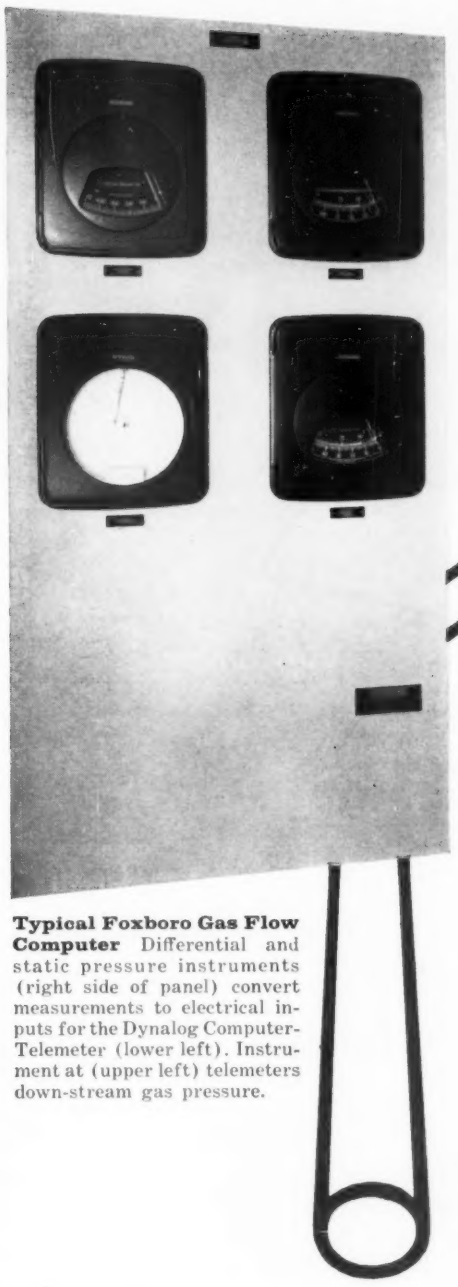
"packaged" automatic gas flow computer systems



Typical Foxboro Gas Flow Computer Differential and static pressure instruments (right side of panel) convert measurements to electrical inputs for the Dynalog Computer-Telemeter (lower left). Instrument at (upper left) telemeters down-stream gas pressure.

piped, wired, calibrated ready for installation

A continuous record of gas flow — into or out of your pipelines — that's the information a dispatcher gets automatically with the Foxboro Gas Flow Computer.

Foxboro systems do their computing at the meter station, automatically compensating for gas temperature and pressure, and transmit total flow values. Transmission errors common to systems that compute at the receiving end are eliminated. Transmission line space is saved as well.

Foxboro Gas Flow Computers are furnished as a complete packaged unit — calibrated and tested as a system before shipment. Installation is as simple as setting the panel unit in place — making connections. Computers are available for both single and multiple meter runs.

Ask your local sales engineer about the Foxboro Gas Flow Computer. He can tell you about many installations in successful operation. **The Foxboro Company, 345 Norfolk Street, Foxboro, Mass.**

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NEW, EXCLUSIVE DESIGN SUITS EVERY PIPELINE CONDITION TO A "T"
IT'S THE WmSON TYPE T PIG
New TRIANGLE design brushes* for more efficient and economical cleaning of all pipelines — *U. S. Pat. Pending

SEE OUR EXHIBIT

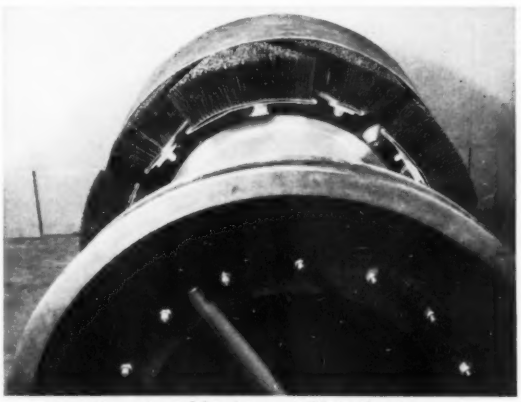
International Petroleum Exposition

MAY 14-23, 1959
Tulsa, Oklahoma

Williamson engineering has developed a new concept in pipeline pig design. This rugged, streamlined pig which is already widely used in gas, products and oil lines is available in sizes 12" and larger. Various engineered designs are available for traversing Gate Valves, Check Valves, Side Openings, Welding Ells, Miter Bends, etc.

- **EFFICIENT** — Exclusive triangle brush for full pipe coverage. (see photo at right)
- **LONGER LIFE** — Greater spring movement for increased cleaning life.
- **ECONOMICAL** — Increased mileage and ease of handling.

There's a "T" Pig Design for your pipeline . . . consult factory for specific recommendations.



Rear view of brushes partially inside pipe.

T. D. Williamson, Inc.

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pipeline news • *Cont'd.*

from page 144

Michigan Wisconsin's new facilities will extend from Marshfield to a connection with its existing pipeline, now extending north to Green Bay, Wis. Cost to Michigan Wisconsin: $41 million.

With the new supply supplementing its present supply received from Texas, Oklahoma and Louisiana, Michigan will be able to expand service to existing customers, start service to 29 towns in northern and central Wisconsin, and extend service into the western portion of the Upper Peninsula of Michigan. Gas going to the Upper Peninsula area will be used in processing low grade iron ore and for service to a number of new communities.

Under its contract with TransCanada, Midwestern has purchase rights to an additional 200 MMcf daily when it becomes available for export to the States.

Tube Turns expands line

Tube Turns Division of Chemetron Corp. is entering the field of flexible piping components with a line of bellows expansion joints.

Initial production of the stainless steel joints will be in 3-in. to 30-in. nominal pipe sizes for applications up to 275 psi and 750 deg. F.

Gas reserves climb to record 254 trillion cu ft

Natural gas proved recoverable reserves reached an all-time high of more than 254 trillion cu ft in 1958, according to the AGA-API report.

A net gain of 7.6 trillion cu ft was achieved during the year, even though net production amounted to nearly 11.5 trillion cu ft—a one-year figure surpassed only by the all-time peak of 11,502 billion cu ft produced in 1957.

Additions to natural gas reserves during '58 totaled 19 trillion cu ft, including 5.6 trillion of new discoveries. Extensions and revisions of earlier estimates amounted to 13.4 trillion cu ft, and an increase of 58 billion cu ft was reported in underground storage.

The nation's estimated proved recoverable reserves have increased from 173.9 trillion to 254.1 trillion cu ft since 1948. This net gain of 80.2 trillion cu ft was recorded despite rapidly increasing demands. Total production during the same period was 92.4 trillion cu ft.

New finds of natural gas liquids reserves in 1958 totaled 108.2 million bbl, second highest in the industry's history. Estimated reserves at year's end totaled 6.2 billion bbl, an increase of nearly 517 million bbl over the 1957 reserves total.

Canadian natural gas reserves climbed to 23.3 trillion cu ft last year, compared with 20.7 trillion at the end of '57. Net production of 381 billion cu ft was reported as against reserve additions of 2.9 trillion cu ft.

Examiner okays Aneth sale without price condition

Fourteen independent producers can sell Aneth field (Utah, Colorado, New Mexico, Arizona) gas to El Paso Natural Gas Co. at their proposed rate of 20 cents per Mcf. The FPC presiding examiner's decision also authorizes El Paso to construct facilities to transport the gas (Docket G-13862 et al).

During hearings, California's attorney general contended that the authorization should be conditioned to limit the price to 12 cents per Mcf. And, the FPC staff wanted the applications to be denied because of the producer's failure to justify the proposed price.

Under its contract with 12 of the producers, El Paso pays for transporting the gas from the wellhead to the processing plant for dehydration. After the liquefiable hydrocarbons are removed, El Paso then pays the producers 20 cents for the residue gas on the outlet side of the gasoline plant. Revenues from the sale of the liquids extracted from the gas are estimated at 21 cents per Mcf. El Paso keeps two-thirds, or 14 cents, of this. The balance goes to the producers. El Paso says this enables it to get back the cost of picking up the gas at the wellhead, compressing, gathering and processing it—at a cost of 14 cents per Mcf.

Contracts with the other products also provide for an initial price of 20 cents, but subject to deductions for processing, resulting in an ultimate price of from 13 to 17 cents.

After reviewing FPC precedents, Presiding Examiner Samuel Binder said that the producers' contention was apparently correct that "they are not under any bur-

From the pioneer in electric resistance weld line pipe...

A

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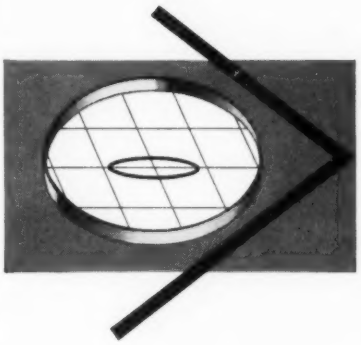

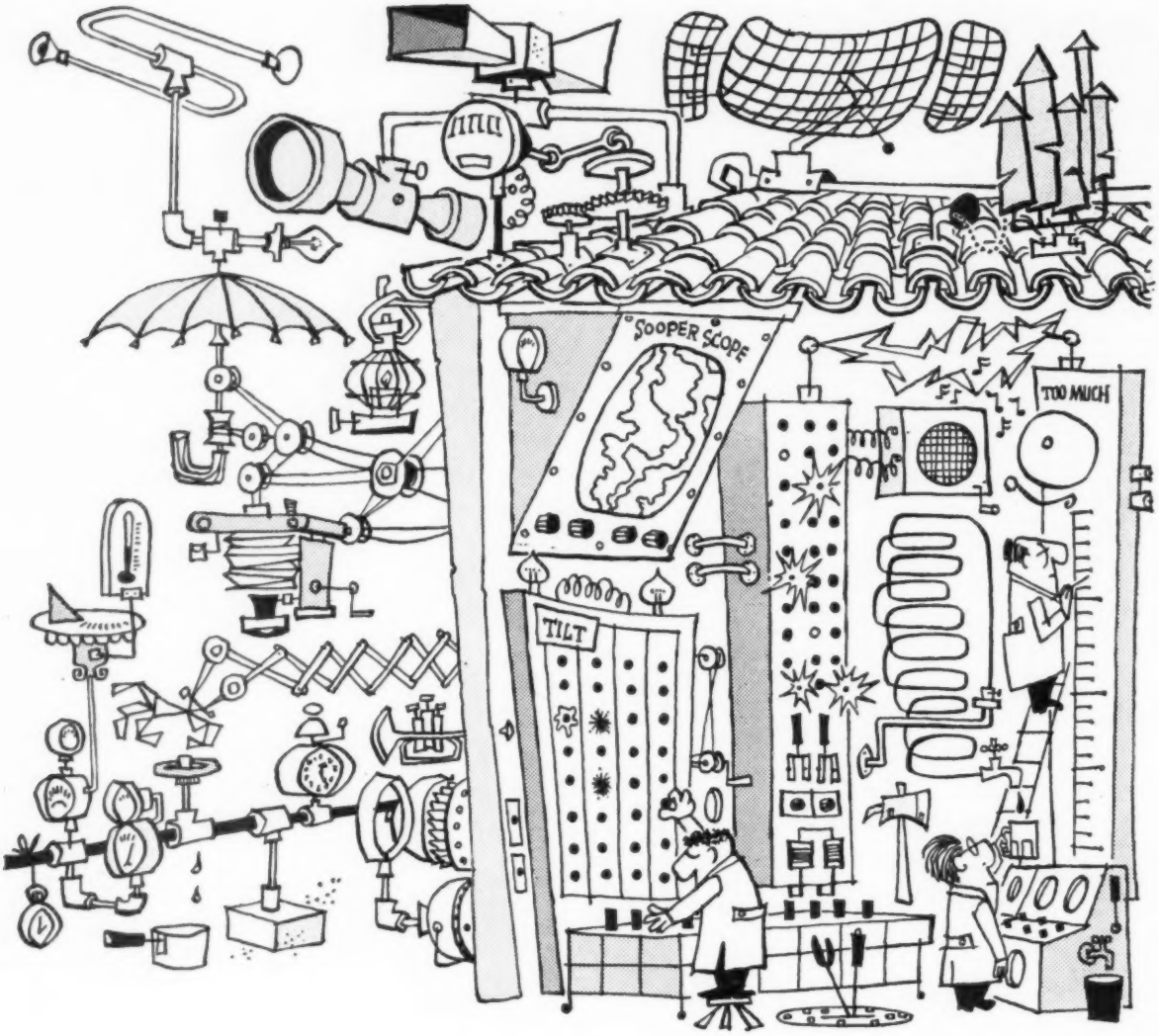

How much control does your pipeline need?

If you have some imagination, like our artist, you can go hog-wild in working out a pipeline control system. If you really wanted it, Union Switch & Signal could even give you a digital read-out of your mother-in-law's blood pressure a thousand miles away.

But clean engineering requires just the right amount of control. We've learned, after 78 years of hard knocks in the control business, that overdesign is just as bad as underdesign. We all strive for positive, reliable, informative, labor-saving control. No more. No less.

Union Centralized Transport Control can remotely operate a single booster station or an entire system. It can provide automatic sequencing, telemetering, data handling and display, data logging, instrumentation and communications.

Union CTC will lower your operating costs, and it is completely error-free. It's a new concept in pipeline control. Write to us so we can tell you about it.

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The 8-ton sled is shown hauling a 2500-hp engine, weighing 100 tons, along one of the main streets of Geraldton, Ontario, en route to its destination some 13 miles away.

den in proceedings of this character to show that the rate at which the natural gas is to be sold is 'reasonable' or 'just and reasonable.' . . ."

Turning to statistical data on gas prices submitted by the FPC staff to show that the applications should be dismissed, the examiner said that while the commission has never ordered evidence of this type excluded, it "has consistently overruled the staff's arguments urging employment of this type of evidence for rate conditioning purposes . . . , or as a basis for denying a certificate."

Under the authorization, the producers will sell about 100 MMcf daily to El Paso. The company was authorized to build facilities to take the gas into its system. Temporary certificates were issued last August and September for the construction and operation of the facilities. The producers got temporary certificates last November to commence sales. Both certificates were conditioned, however, to require the producers to agree to refund to El Paso any amounts in excess of those resulting from the rate the FPC finally determined to be proper.

Giant sled hauls engine to compressor site

A giant sled—32 ft long, 11 ft wide, and weighing 8 tons—was used to haul three 100-ton engines to a Trans-Canada Pipe Lines compressor station site. The engines had to be moved through the streets of Geraldton, in northwestern Ontario, along a country highway, and across 10,000 ft of muskeg on the pipeline ROW.

The compressor station site is 13 miles from Geraldton and seven miles from the closest highway, on the section of lines built by the Northern Ontario Pipe Line Crown Corp. and operated by Trans-Canada Pipe. The engines had to be moved to the site during winter weather to prevent damage to the roads and to enable the heavy load to cross the 10,000 ft of muskeg.

Trans-Canada men fabricated the sled at Port Arthur and trucked it to the Geraldton railway yard, where the engine was loaded and hauled away. The first engine was moved with a side-boom tractor and a bulldozer pulling and two bulldozers pushing the 108-ton load.

The weather helped out in the muskeg country. Frost extended to a depth of 4 ft and the night before the move a heavy snowstorm blanketed the area.

Quebec Natural crossing St. Lawrence river

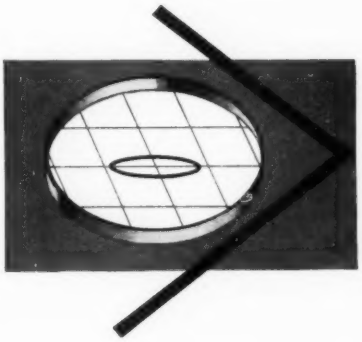
Quebec Natural Gas Co., Montreal, is building a pipeline across the St. Lawrence River at Montreal to supply the fast-growing south shore area. Main target is the $100 million steel mill complex in the Contrecoeur-Varennes-La Prairie district. Gas consumption estimates up to 4 billion cu ft per year by 1965 are foreseen.

According to Quebec Natural's Leonard Milano, this is the first gas line crossing the St. Lawrence in Canadian history. First delivery of gas is due in late August at the new Steel Co. of Canada mill, presently under construction. Initial gas line outlay is estimated at $5 million. Long-range expansion to meet growth needs will cost several times this amount.

"Engineering problems for this

From the pioneer in electric resistance weld line pipe...

A DRAMATIC NEW ADVANCE!



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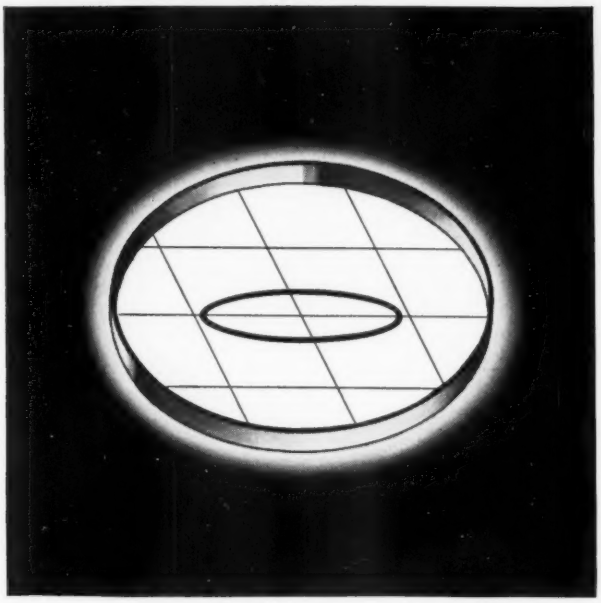

The most important line pipe advance of the decade!

Coming your way – Electric Weld Line Pipe with quality you can actually measure! Not a laboratory theory... not a mere quality control test. But a *proved* production safeguard that assures performance in the field. This safeguard has been used by Republic with complete success in the production of small diameter light wall tubing, such as aircraft, boiler tubes, etc., for other critical applications for years.

Details will be announced next month at the Oil Show in Tulsa, Oklahoma. Until then it can be said that this exclusive Republic safeguard detects flaws which ordinarily would be passed over by other methods.

Utmost uniformity – a characteristic of Republic Electric Weld–remains unchanged. You will continue to enjoy accurate line-up of joints, smooth bending in field or shop, uniformly high yield strength and ductility.

Learn about the line pipe with quality you can measure. Visit Republic at booth #102-115 (Kansas Building), International Petroleum Exposition, May 14-23.

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river crossing are unusual," Mr. Milano said. "Two plans have been under study in cooperation with government and municipal authorities. One involves a submarine water crossing of several thousand feet.

"The other plan, which now appears most feasible, is a crossing via the Jacques Cartier bridge, a 2-mile long project which has recently undergone span elevation to accommodate new St. Lawrence Seaway shipping. Certain line suspension facilities installed when the bridge was built will speed up the work."

The gas line will connect with Quebec Natural's main natural gas header on Montreal Island.

Pioneer, Permian, El Paso file related projects

Hearings will get under way this month on plans of Pioneer Gathering System Inc., Permian Basin Pipeline Co., and El Paso Natural Gas Co. to build facilities estimated to cost $9.5 million.

Pioneer (Docket G-11548, et al) wants to spend $3.6 million on facilities so it could buy gas in Texas and move up to 80 MMcf daily for delivery to Permian in Schleicher county, Texas.

Permian (Docket G-11581) will construct 83 miles of 16-in. line from the Pioneer connection to its existing facilities at Spraberry, Texas. Permian also has plans for a new 3960-hp compressor station. Estimated cost: $5 million.

El Paso (G-15243 and G-16200) wants to spend $849,000 on facilities to transport gas available to Pioneer in Sonora and Buckhorn fields and available to El Paso from the Vinegarone field.

Transco's third loop plan slated for hearing

Hearings on Transcontinental Gas Pipe Line Corp.'s plan to build a third line from the Gulf Coast to its Philadelphia-New York-New Jersey market get under way this month (Docket G-16603 et al).

The $68.9 million task calls for 288.5 miles of loops, most of which would be 36 in. on the southern portion of its mainline system; 61,380 hp in two new and 11 existing compressor stations, located for the most part on the northern part of the system. In addition, Transco proposes new field facilities to pick up gas from several producers in Louisiana; a loop on its lateral near Philadelphia; and three new sales meters for delivering increased volumes of gas to existing customers.

Pipeline capacity will be hiked 145.5 MMcf daily. This gas would meet increased needs of 44 existing resale customers and increase its existing firm transportation service for Sun Oil Co. by 9 MMcf per day to 29 MMcf. The incremental sales capacity increase would bring Transco's peak day pipeline capacity to 1336.1 billion cu ft, excluding storage deliveries and gas transported for Tennessee Gas Transmission.

United gets Belle Isle gas without rate condition

An FPC presiding examiner okayed Sun Oil Co.'s sale of gas from the Belle Isle field, Louisiana, to United Gas Pipe Line Co. without an initial price condition, requested by two intervenors (Dockets G-15122 and 15123).

Under the agreement, United will buy a minimum of 36.6 MMcf daily. It will increase to 46.5 MMcf daily if an estimate by Sun of additional reserves proves correct.

Anywhere . . . anytime!
Parkhill has the men, the equipment
and the experience to handle your next pipe
stringing job, large or small. Give us a call
and park your problems with Parkhill.

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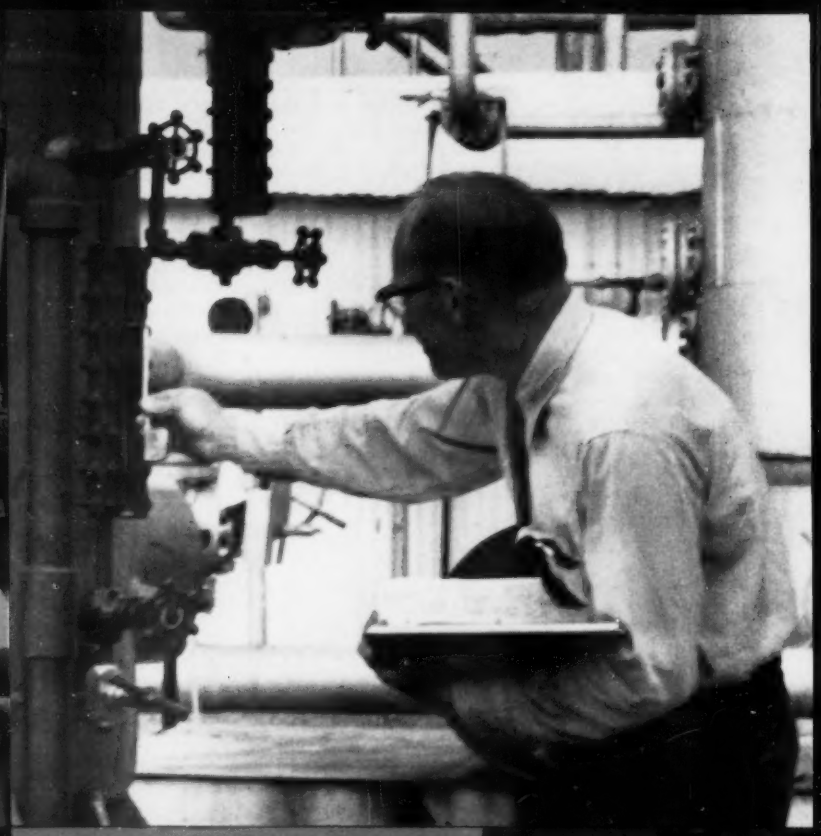
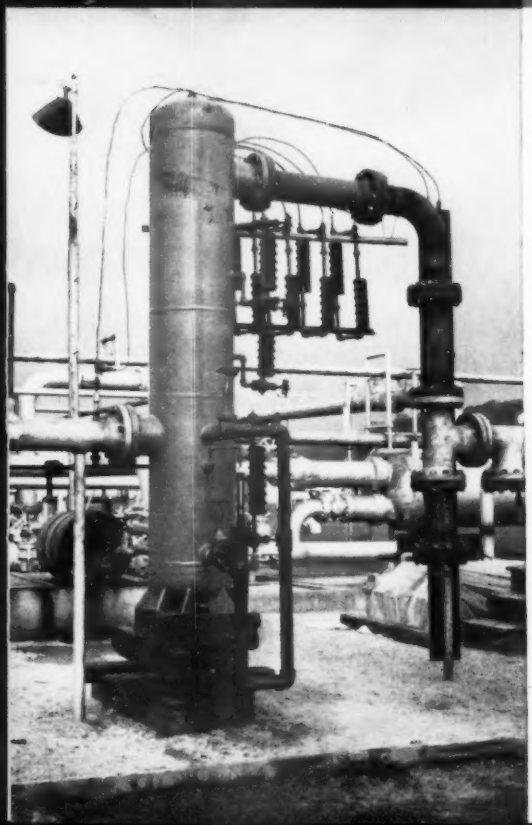


PROJECT NFX-12



. . . A.G.A.'s giant step toward cleaner gas

You're looking at the test site of a vital research project sponsored by the American Gas Association. Six competitive gas cleaners—including Blaw-Knox—were studied for cleaning and oil loss efficiencies.

It was an important step . . . the first time gas cleaners have been so scientifically and impartially tested. The project set the stage for continuing research to improve gas cleaner performance.

Following the test, Blaw-Knox was the first to build a new pace-setting "Multi-Phase" cleaner. Now proven by our extensive supplemental testing, the Blaw-Knox "Multi-Phase" cleaner surpasses previous performance for low oil loss while cleaning gas of even sub-micron size foreign particles.

Blaw-Knox is proud to have been part of the A.G.A. project. From it comes the best gas equipment in Blaw-Knox's history to assure you of cleaner gas at lower cost. Let Blaw-Knox give you more details. Write . . .

BLAW-KNOX

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Buflovak Equipment Division
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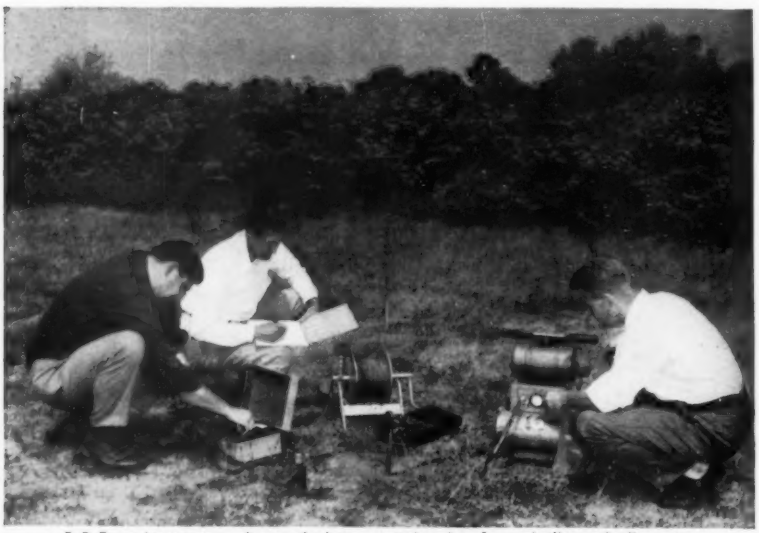
Initial price of the gas is 21.5 cents per Mcf, plus state taxes of 2.3 cents, for a total of 23.8 cents. The New York PSC and United Gas Improvement Co. intervened. They contended the certificate should be conditioned to limit initial price to a maximum of 17 to 18 cents per Mcf.

Presiding Examiner Harry W. Frazee said there was no showing that there would be any increase in price to the ultimate consumer because of the purchase of the Belle Isle gas by United. He also noted that the proposed rate would not set a new ceiling price in the area.

He also agreed with the FPC and the courts in earlier decisions that where the rate condition issue is injected into a proceeding, "the burden of going forward with the evidence relating to the attachment of the rate condition is on the party raising the issue. . . ." He concluded that there was "no such showing in this record" of either UGI or the New York commission establishing the reasonableness of their request for a 17 to 18 cent price condition.



E. R. P. engineers use modern methods to get design data for a pipeline cathodic protection system. This group is making current requirement tests for designing a ground bed.

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E. R. P. corrosion engineers are trained specifically in cathodic protection techniques. They evaluate all pertinent data *before* designing a pipeline cathodic system. *After* design and installation, continued E. R. P. surveys help maintain the efficiency of the system. They warn of environmental changes that affect complete protection.

Cathodic protection is, after all, like any tool. It requires skill and knowledge to use the tool successfully.

The cost of a cathodic system should always be measured by the savings achieved through maintaining full corrosion control, not just by the first cost of the system. On this basis E. R. P. designed cathodic systems give maximum savings for each dollar spent. For full information about E. R. P. cathodic protection for pipelines write for Bulletin E-43.41.

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regulatory • *Cont'd.*

from page 12

system of product identification, which could be practiced by their industry to permanently mark all plastics pipe produced as to base material used at intervals along the pipe not to exceed 12 in.; and which could be practiced also in the production of plastics fittings to permanently denote the basic material used.

"It has been further recommended that all suppliers of solvents and cements should label their products to indicate the kind or kinds of plastics pipe with which they can be used. The subcommittee believes that there is a definite need for the permanent marking of plastic materials to assure correct identification of different plastic materials which may be in stock or which may be installed in a piping system. It is believed that in time many companies will have used a number of different kinds of plastics pipe, which will make it necessary for construction personnel to correctly identify as to kind any plastic pipe exposed for construction purposes.

"The subcommittee has submitted requests to the reinforced plastics pipe division of the Society of the Plastics Industry for technical data and other pertinent information on reinforced plastics pipe materials. They have informed us that they are not as yet prepared to provide us with the desired information, but that they are definitely interested in the development of reinforced plastics pipe test and size standards for the protection of all potential users. They have advised us also that such standards are in the formative stage of development.

"The subcommittee believes that considerable new information on the subject of plastics pipe materials will be made available in the not too distant future when research and test projects now under way are completed. As such information is released, the AGA Subcommittee on Plastic Pipe Standards will continue to keep the gas industry appraised of late developments." ■

HALLEN TIE-IN CREW

on relocation of Tennessee Gas Transmission Company line in Westchester County, White Plains, New York

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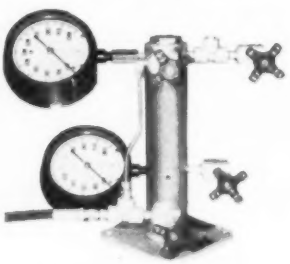

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Washington • *Cont'd.*

from page 17

refused to permit the jobbers to intervene.

Basis of the appeals court ruling was that the jobbers would be in competition with the natural gas and therefore had a right to be heard during the hearings leading up to the authorization.

THE day may come in the not too distant future when natural gas distributors and producers go to war over imports of the fuel. It would be similar to the fight now splitting the petroleum industry.

Unlike the situation in the crude oil business, however, the battle may develop before the import problem arises.

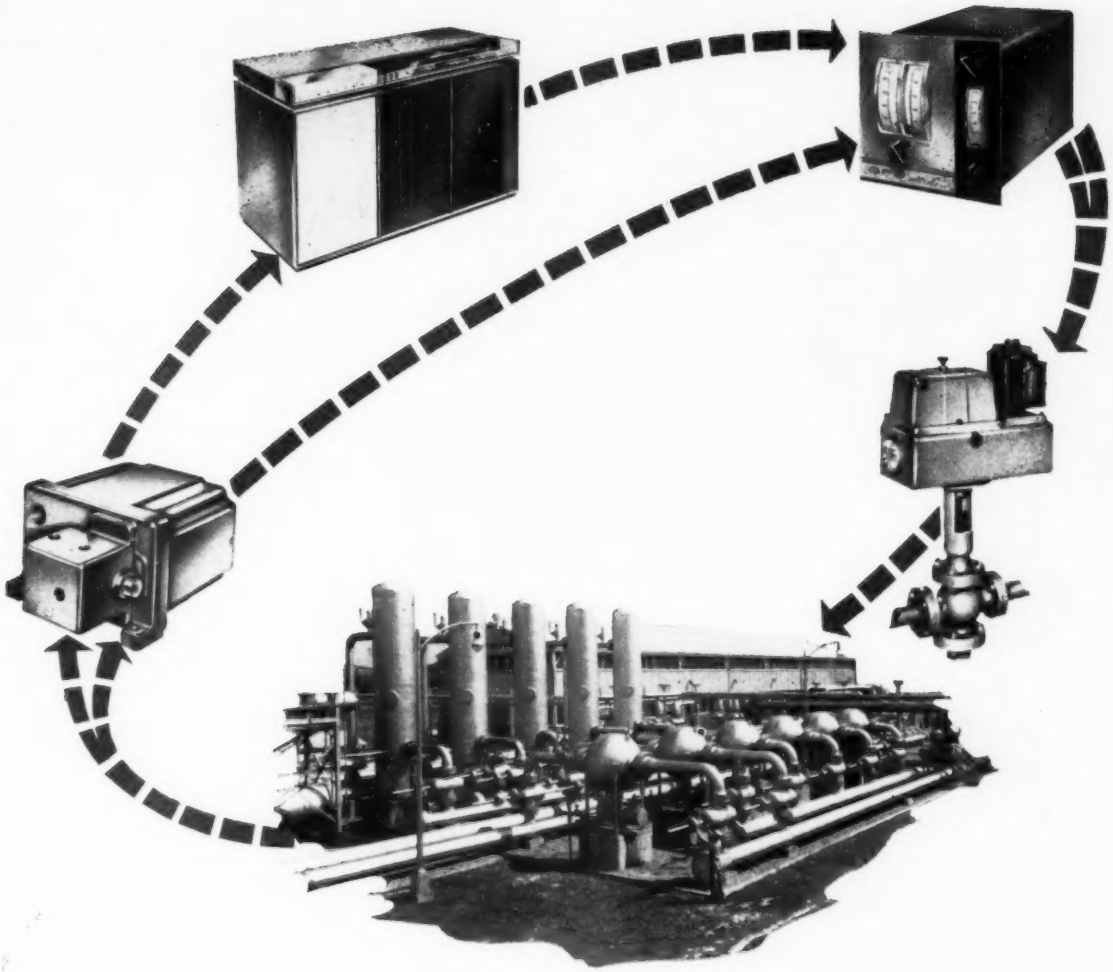
Some domestic oil producers have been fighting for government help to protect them from cheaper foreign crude for years. They finally won recently when the President put mandatory quotas into effect. (The battle, naturally, is still raging with several congressmen sponsoring legislation to rescind the quotas "in the interests of consumers.")

The apparent success of shipments of liquefied natural gas (methane) by tanker from South Louisiana to England is stirring some government officials to get the battle over import regulation underway.

Federal Power Commission member William R. Connole is among them. He says that Congress, working with "all segments of the natural gas industry," should begin now a "careful and cooperative" study of the "problem" of natural gas imports before the art of shipping liquefied methane by ship becomes too far developed.

At present, the government has no power to in any way restrict such shipments. It can through Congress study the matter. If or when imports of natural gas become a threat to domestic producers, then the government can act under the protective provisions of the tariff and related laws.

This, of course, shoves the FPC out of the picture entirely. There is some mumbling that Commis-



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sioner Connole (a strong candidate for the next FPC chairman if Kuykendell retires) is setting the stage for the FPC to secure some power over natural gas imports.

Mr. Connole, a determined and outspoken lawyer, says a competitive battle between domestic gas production and liquefied methane imports is inevitable. If the price is right for imported gas, he says, transportation of this gas to the U. S. from South America or even the Middle East would be as appealing as it is now to ship it to Europe. With the price of domestic gas rising fairly steadily, this point may be reached before too long, many experts believe.

The more gas that is shipped by tanker to Europe, he says, the more efficient handling and processing methods will become, and the lower the cost of delivery will fall. Thus the competitive position of imported gas to this country will continually be improved over the next few years.

The commissioner believes cities such as Boston, Providence, New York, Philadelphia and Baltimore, with an "insatiable demand for gas," will become the first markets for imported liquefied natural gas when the price does become competitive.

The first transoceanic shipment of liquefied methane was landed in England in late February. It carried some 32,000 bbl. This shipment was not economical, and was not intended to be. It was merely a test of the processes involved. But backers of the project plan, if the system proves out after three or four shipments, to build larger liquid methane carriers which will make the shipments competitive.

At least one other firm is planning to get into the liquid methane transportation business. The first shipment was a project of the Constock International Methane Co., Ltd., A new firm, Hidrocarburos, S. A., formed by several American firms, is also bidding on Venezuelan natural gas. Constock is proposing to buy gas for 7 cents per Mcf. The new firm reportedly has offered as much as 10 cents.

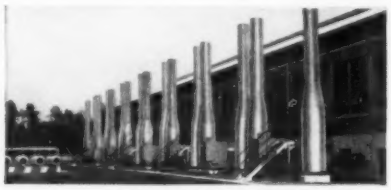
At present, some 500 Mcf a day is available for export from Venezuela.

Commissioner Connole predicts that liquefied methane will be imported into this country within five years. He is urging the government or Congress to adopt a national fuels policy before this occurs, with a method included by which minimum prices could be set. Such prices could now be set only under the tariff laws and only after shipments were causing some economic or defense threat.

One of the first uses for imported methane will undoubtedly be peak shaving, the commissioner says.

At least two congressmen are sponsoring measures to impose an import tax on natural gas. These measures are aimed primarily at imports of gas by pipeline from Canada, but would also affect liquefied imports.

Both measures would amend the internal revenue laws to impose the tax. A measure by Cleveland M. Bailey (D., W. Va.) would impose a tax of 5 cents per thousand cubic feet. Rep. Eugene Siler (R., Ky.) would impose a tax of 10 cents. ■



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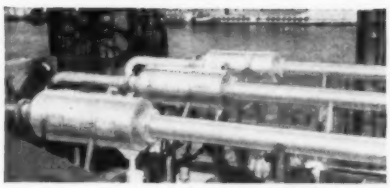
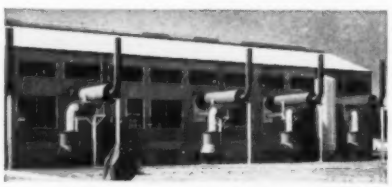


OIL WELL DRILLING RIGS



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GAS Pipeline People

Willis Strauss
Northern

Raymond Miller
Northern

WILLIS A. STRAUSS has been elected executive vice president of Northern Natural Gas Co., Omaha. Strauss was administrative vice president. He now will report to President John Merriam and, under his direction, be responsible for all company operations, working within the framework of policies set by the president, the policy committee, and the board of directors. Northern opened a new gas supply office in Billings, Mont., last month. Manager of gas supply there is RAYMOND W. MILLER.

FELIX A. MULGREW, vice president of Bankers Trust Co.'s Public Utility Group, has been named a director of The Houston Corp., St. Petersburg, Fla.

FRITZ O. BEFELD has been appointed sales representative for W-K-M, division of ACF Industries Inc., in the southeast. Befeld, with W-K-M since 1937, will locate in Atlanta and cover Georgia, Florida, Alabama, Tennessee, and the Carolinas.

CHARLES E. WILLIAMS has been named vice president of Continental Tube Co., Houston, an affiliate of the Crispin Co.

FRED M. ODOM JR. and C. A. SULLINS are new members of Union Producing Co.'s board. Odom has

Felix Mulgrew
Houston Corp.

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Jerry Donda
NGPL

James Miller
NGPL

served as vice president of United Gas Corp., United Gas Pipe Line Co., and Union Producing Co. since 1957. He was executive secretary to Board Chairman N. C. McGowen from 1947 to 1957. Since November 1958, Sullins has been general drilling and production superintendent in Shreveport.

JOHN W. PRICKETT is the new manager of public relations at Natural Gas Pipeline Co. of America and its affiliates. He succeeds ROBERT H. LEWIS, who has resigned. In other changes, JAMES F. MILLER was named manager of employee relations and JERRY J. DONDA, assistant editor of "Between the Lines," was named editor of the companies' magazine.

JOHN W. DENHOLLEM has been appointed to the new post of superintendent of drilling and production in Arkansas Louisiana Gas Co.'s production and exploration division. Denhollem has been production superintendent and chief production engineer. Promoted in the same division were WYATT H. THOMAS to chief production engineer and FRANK P. YARBROUGH to production coordinator.

Several appointments are announced by Southwestern Industrial Electronics Co., a division of Dresser Industries Inc., Houston. REX B. GREY has joined the organization as manager, control division; JOSEPH B. TATE is manager, military electronics division; and NEWTON E. ARMSTRONG, until recently product manager in the control division, is now manager, systems development division.

Representing Ladish Co., Cudahy, Wis., in its newly opened Dallas sales office are W. F. BROCKWELL and R. O. BARLEN.

RICHARD L. SPETKA has been promoted to manager, power engine sales, of the Cooper-Bessemer Corp., Mount Vernon, Ohio. Spetka formerly was in Cooper-Bessemer's New York domestic office. He has succeeded FRANK L. FRIEDLI, who now heads the sales efforts of the En-Tronics controls division.

C. TAYLOR MARSHALL, vice president and general manager of the Coke & Iron division of Pittsburgh Coke & Chemical Co., has been honored with the J. E. Johnson Jr. Award of the Metallurgical Society of the American Institute of Mining, Metallurgical, and Petroleum Engineers.

ROBERT F. DAVIS has been named manager, two-way radio sales, of a 13-state Midwest area for Motorola Communications & Electronics Inc. Taking Davis' former post of regional manager in parts of Illinois, Indiana, Wisconsin, and Michigan is ERIC GOLEAS.

WILBER HADLEY MACK has been elected to the board of directors of American Natural Gas Co. Mack is executive vice president and general attorney of both American Louisiana Pipe Line Co. and Michigan Wisconsin Pipe Line Co. (American Natural subsidiaries), vice president and secretary of American Natural Gas Production Co., and general attorney of American Natural Gas Service Co.

H. M. JONES has joined Perrault Equipment Co. Inc., Tulsa. Jones, who has served with several major pipeline contractors, will be Perrault's Houston representative.

PAUL L. PATTERSON has been appointed special sales representative in the Houston area for Frank Wheatley Supply Co., Tulsa. Until recently, Patterson was with the industrial division of Goodyear Tire & Rubber Co.

RICHARD A. SCHLOBOHM is district manager of the newly established Philadelphia office of Joy Manufacturing Co.'s industrial division.

GAS CALENDAR

May

5- 7 AGA Research & Utilization Conference — Hotel Carter, Cleveland, Ohio.
6 New Jersey Gas Association Home Service Workshop —Public Service Auditorium, Newark, N. J.
6- 8 Public Utilities Advertising Association Annual Convention—Sheraton Hotel, Dallas.
11-12 AGA Eastern Gas Sales Conference—The Netherland-Hilton Hotel, Cincinnati.
14-23 International Petroleum Exposition & Congress—Fairgrounds, Tulsa, Okla.
18-19 AGA Operating Section Transmission Conference—Statler-Hilton Hotel, Dallas.
18-19 AGA-Mid-West Regional Gas Sales Conference—Edgewater Beach Hotel, Chicago.
19-21 Pennsylvania Gas Association—Pocono Manor Inn, Pocono Manor, Pa.
20-21 PCGA Home Service Workshop—Hotel Utah, Salt Lake City.
20-23 Florida-Georgia Gas Association Spring Convention —Fort Harrison Hotel, Clearwater, Fla.
21 NEGA-AGA Public Relations Workshop — Sheraton Plaza Hotel, Boston.
21-22 Natural Gas & Petroleum Association of Canada—Hamilton, Ont.
25-27 AGA Operating Section Production Conference—Hotel Sheraton, Rochester, N. Y.
27-28 PCGA Distribution Conference Operating Section—Mar Monte Hotel, Santa Barbara, Calif.

June

1-5 AGA Air Conditioning Sales School—Baker Hotel, Dallas.
2- 4 Appalachian Underground Corrosion Short Course —University of West Virginia School of Mines, Morgantown.
4-5 NEGA Residential Sales Workshop—Eastover, Lenox, Mass.
7-9 Wisconsin Utilities Association Accounting Section Convention—Lake Lawn Lodge, Delavan, Wis.
9 NEGA Operating Division—Worcester Polytechnic Institute, Worcester, Mass.
10-12 NEGA Gas Measurement & Control School—Worcester Polytechnic Institute, Worcester, Mass.
14-16 AGA-INGAA National Public Relations Conference —Edgewater Beach Hotel, Chicago.
22-23 Michigan Gas Association—Grand Hotel, Mackinac Island, Mich.
22-25 Canadian Gas Association Annual Meeting—Empress Hotel, Victoria, Canada.

August

26-28 Mid-West Gas Association Gas School & Conference —Iowa State College, Ames, Iowa.

September

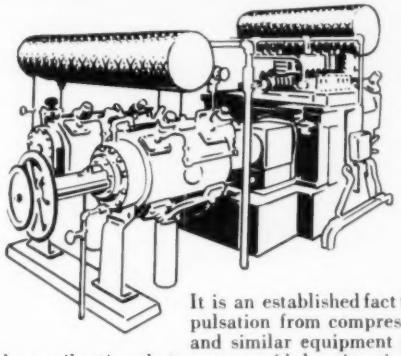
4 New Jersey Gas Association Annual Convention—Berkeley-Carteret Hotel, Asbury Park, N. J.
9-11 Pacific Coast Gas Association Annual Meeting—Ambassador Hotel, Los Angeles.
14-18 AGA Industrial Gas School—Penn-Sheraton Hotel, Pittsburgh.
15-16 AGA Accident Prevention Conference—Dinkler Plaza Hotel, Atlanta, Ga.
17-18 AGA Great Lakes Public Relations Workshop—Dearborn Inn., Dearborn, Mich.

BURGESS-MANNING

SNUBBER NEWS

Dedicated to the Elimination of Pulsation and Intake and Exhaust Noise

HOUSTON TEXAS GAS & OIL CORPORATION'S COMPRESSOR PIPING GUARANTEED TO BE KEPT VIBRATION-FREE BY BURGESS-MANNING SNUBBERS



It is an established fact that pulsation from compressors and similar equipment produces vibration that causes rapid deterioration of equipment, skyrockets maintenance costs and often threatens the very structures housing the equipment.

Recognizing this, the builders of the Houston Texas Gas and Oil Corporation's natural gas pipe line to Florida are installing 48 Burgess-Manning Snubbers of eight different designs on the compressors at the four stations along the line.

Burgess-Manning Company is guaranteeing the successful operation of all compressor piping and related inline equipment without excessive or damaging pulsation.

Successful accomplishment of guaranteed results has become a foregone conclusion to Burgess-Manning customers in the gas transmission, petroleum and chemical industries. If you are experiencing, or anticipating, a similar problem, you can consult Burgess-Manning engineers, without obligation, for a guaranteed successful solution.

This is a cross-section of a Snubber typical of many styles used by Burgess-Manning to eliminate pulsation in gas or air pipe lines, or for the suppression of exhaust or intake noise from internal combustion engines, pumps, etc.

SEND US a brief outline of your pulsation or exhaust noise problems and we will gladly send you pertinent literature.

Sound Engineering

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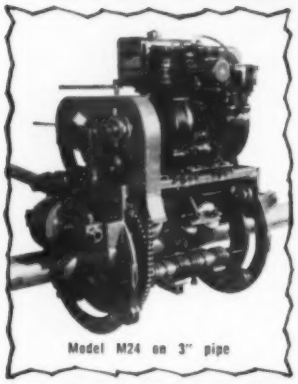

Model M24 on 3" pipe

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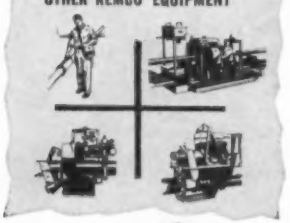
Perfect for new pipe or reconditioning work, this new, compact cleaning machine will clean pipe up to 10 times faster. Lightweight and nearly vibrationless, it is ideal for working on loaded lines. It travels up to 25 ft. per minute and has an exclusive floating design which permits easy passage over collars. It uses standard knives, cutters and brushes or the new Remco rotary cup brushes. Easily adapted for taping, priming, doping, or for stationary service, it comes in 6 standard sizes for 2" through 30" pipe.

OTHER REMCO EQUIPMENT



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GAS • News Notes

New York electric utilities raised rates $15.2 million in 1958—about 40 per cent of the total $35.4 granted all utilities by the New York PSC. Gas companies sought hikes of $9.5 million, got $9.2 million. The commission said that this marked the first time in over 20 years that increases for electricity outpaced those for other utilities.

Southwestern Industrial Electronics Co. has opened its new 300,000-sq ft research, development and manufacturing plant in Houston. SIE, one of the Dresser Industries, produces electronic instrumentation.

Longview, Texas, is the site of new and expanded warehouse facilities of Grove Valve & Regulator Co., Oakland, Calif. The new warehouse, formerly located in Houston, triples available warehouse space. A sales service office also is maintained in Longview.

Kynos, S.A., is producing Koehring excavators at a new plant in Madrid, Spain. Current plans call for Kynos to build the Koehring ¾-yd size excavator for the Spanish market. It also will produce Kwik-Mix and C. S. Johnson trademark products. Koehring has similar manufacturing agreements with Newton Chambers Ltd., England, and Ishikawajima - Koehring in Japan.

Southern California Gas Co. meter shop employees worked a record 1.5 million manhours without a disabling accident during the past 7½ years. Under the director of meter shop supervisor W. F. Connor, the 89-man crew amassed 1,579,312 manhours without a lost-time injury.

Gas and electric top - surface thermostatic range controls, gas and electric oven controls, gas incinerator controls, water heater and home heating controls, and other control devices and accessories will be shown at the Japan International Trade Fair in Tokyo, May 5-22. Sanko Co. Ltd., Tokyo, will exhibit products of Robershaw-Fulton Controls Co. in the most complete control display ever exhibited in the Orient. Sanko is exclusive sales representative in

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Japan for Robertshaw appliance controls.

Niagara Mohawk Power Corp., Syracuse, N. Y., has contracted with the Radio Corp. of America for a $1.2 million electronic data processing system on a lease basis. The new system, expected to be in operation by the end of 1960, will initially serve customer accounting operations. Eventually, it will be used in other phases of company operations.

Shipments of Arkla-Servel All-Year gas air conditioners for February exceeded any previous month in the history of the company. Arkla president W. R. Stephens said 931 units were shipped from the Evansville plant, topping the former high of 834 units. In February 1958, 492 units were shipped.

The Ka-Mo department of Kwik-Mix Co., Port Washington, Wis., has named two new distributors. They are Contractors Machinery Co., Grand Rapids and Detroit, Mich., covering the entire lower peninsular of Michigan, and the Fornaciari Co., Los Angeles. Fornaciari covers 15 southern California counties and Clark county, Nev.

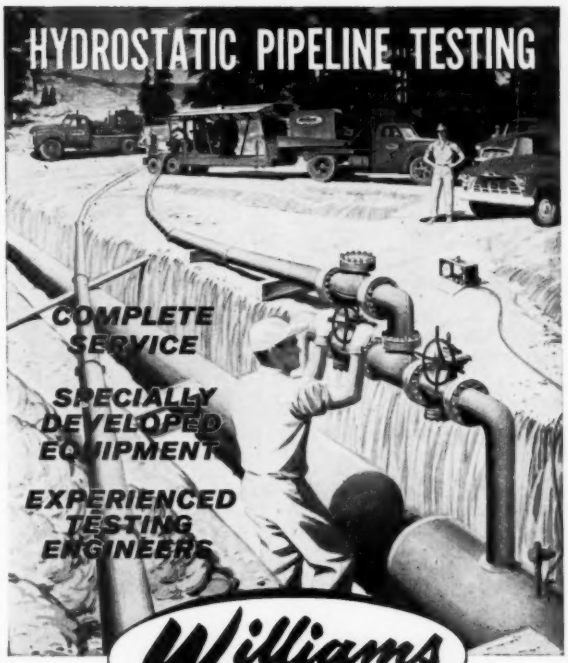
Several distributors have been named by A. M. Byers Co., Pittsburgh. They are Mid-State Supply Co., Kansas City, Mo.; Brown Pipe & Supply Co., Albuquerque; and Union Supply Co., Durham, N. C.

Arkla Air Conditioning Corp. has purchased outright the Humphrey line of gas heating equipment made by General Gas Light Co., Kalamazoo, Mich. Manufacture of the line will transfer to the Arkla plant at Evansville.

Wheel & Track Equipment Inc., Sharonville, Ohio, has been named excavator distributor by Bucyrus-Erie Co., South Milwaukee. Territory comprises parts of Ohio, Indiana, and Kentucky.

Ebasco Services Inc., New York, has completed arrangements for its affiliation with Pacific Planning & Research Inc., a city planning firm with offices in Sacramento and Palo Alto, Calif.

American Meter Co. has moved its New England sales office to 250 Stuart street, Boston, Mass.



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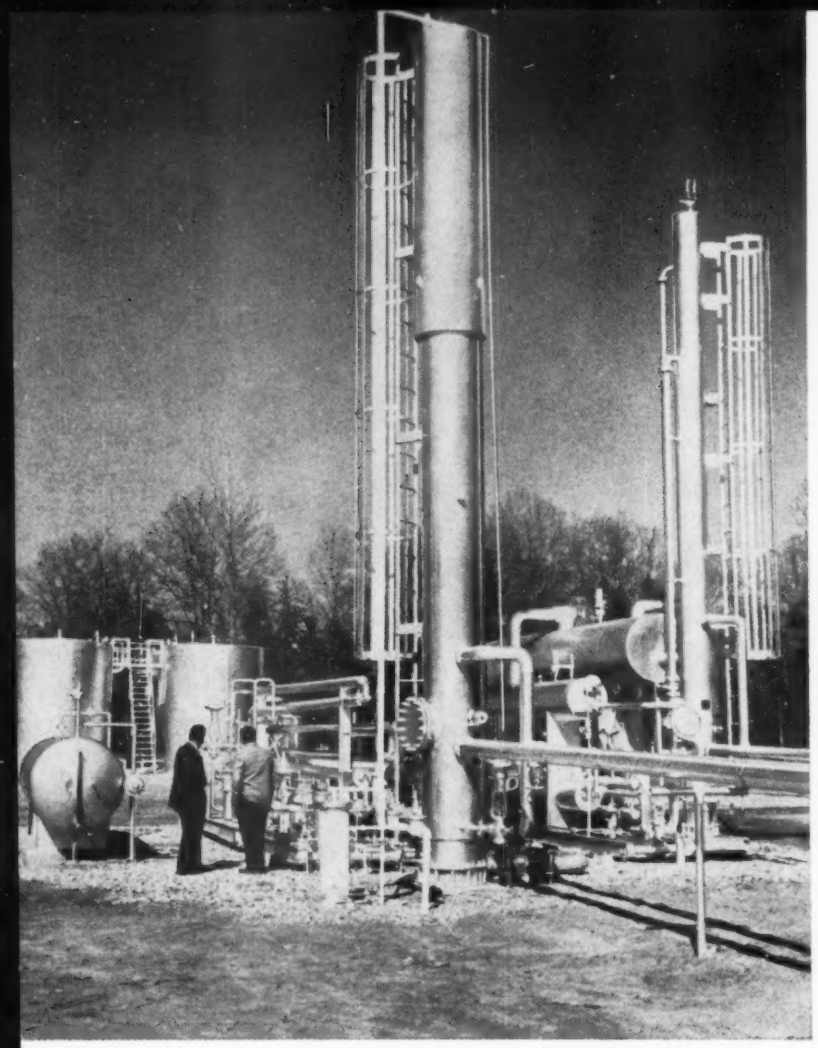

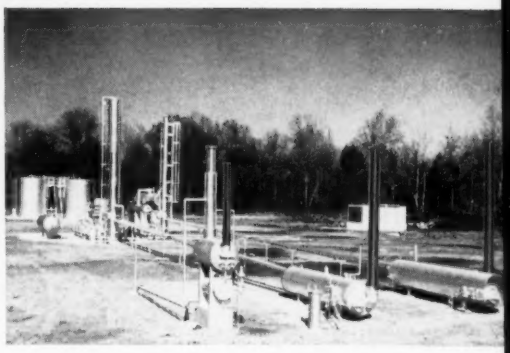

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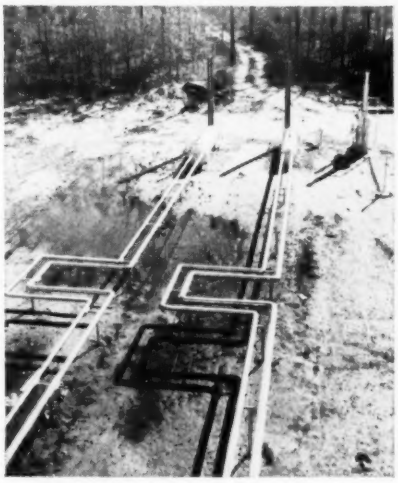

This BS&B 5GDH "COLD-FRAC" with a 25-ton BS&B Ammonia Absorption Refrigeration Unit, owned by W. E. Hall, H. M. Harrell, D. B. McConnell, et al, was recently put into service at Stinson #1, Sligo Field, Bossier Parish, North Louisiana. The unit is recovering slightly more than 74.5 bbls. of condensate per MMSCF D — an increase of over 39% from the 53.5 bbls. per MMSCF D recovered on standard separator test.

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Inlet temperature	150° F.
Sales pressure	700#
Low temperature separator	0° F.
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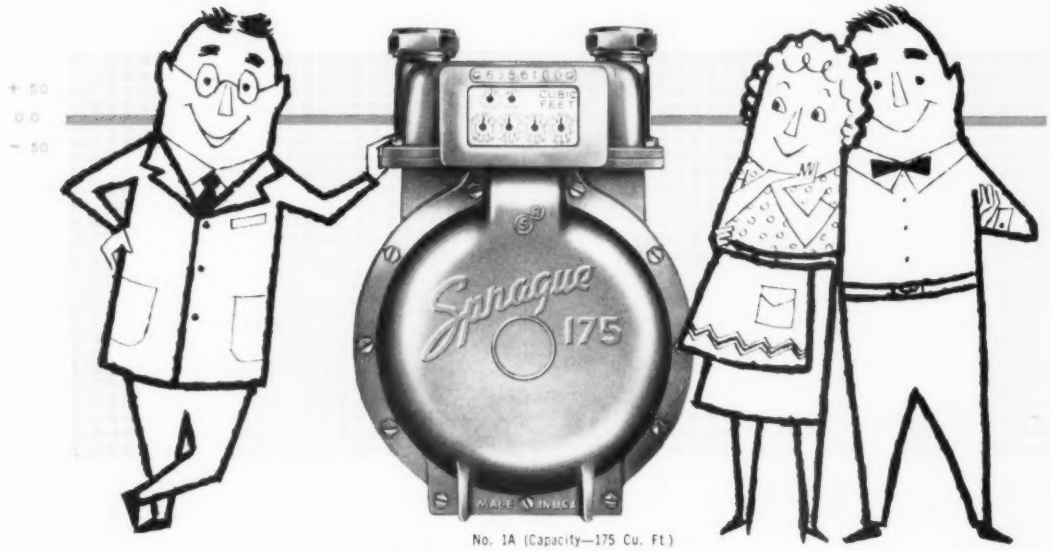

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